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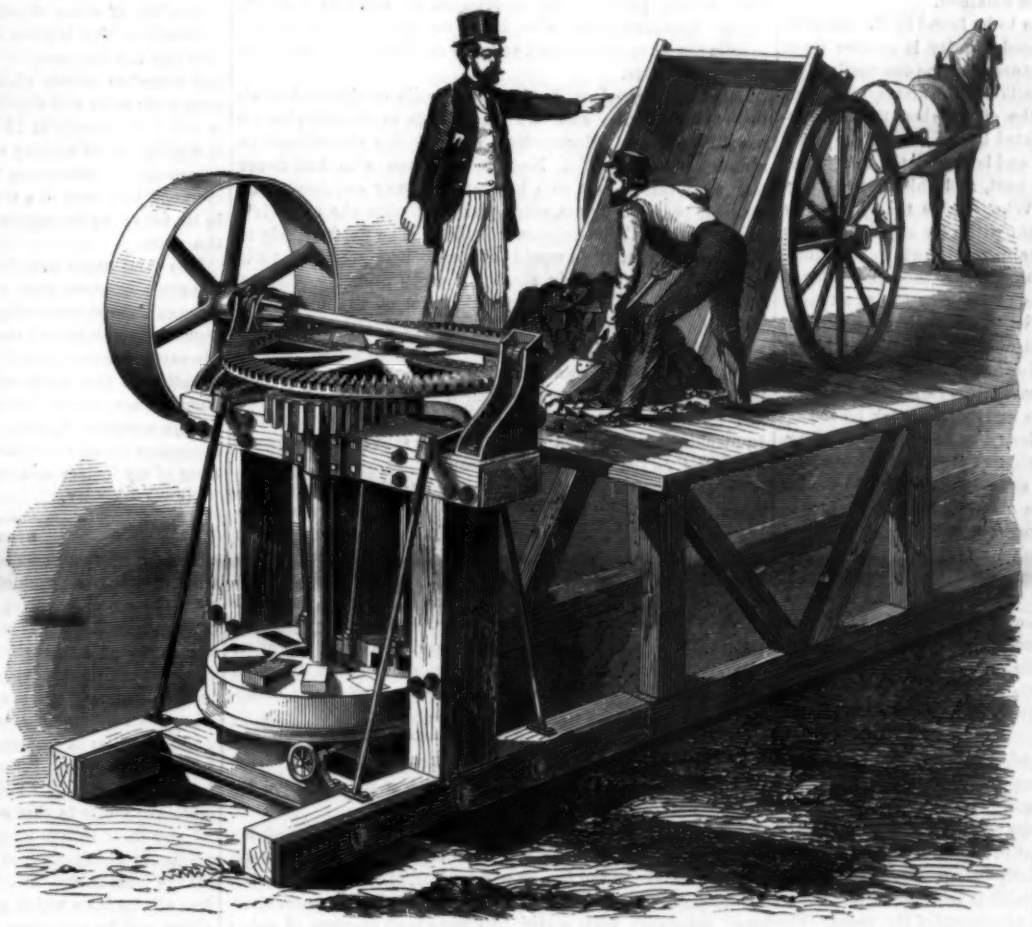
Improvement in Mold Wheel Brick Machines.

This machine is of that class which uses what is called the mold wheel and pug mill. The internal or detail parts of this machine, are different from any of those we have previously illustrated, although similar in appearance. The propeller for filling the molds; the track for raising and lowering the followers, and changing the thickness of the brick; the novel arrangement of pressing each brick after the mold has passed from under the pug mill, and regulating the pressure so as to make a perfect finish on the top of the brick, without the use of ascraper, have been thoroughly tested, as four of these machine were put in operation and run very successfully last year. This machine was exhibited at the Missouri State Fair at St. Louis, in Sept. 1867, and was awarded the first premium, although several other kinds were exhibited; but the inventor claims that this machine is so constructed that stones or even iron in the shape of nuts, bolts, wrenches, hammers, etc., can pass through without any injury to the machine. The proprietors state the following as the prominent features and advantages of the machine:

"Its weight is about three tuns, all complete; its capacity is from 20,000 to 30,000, by steam power. Serious objections have been made to brick made on mold wheel machines, from the fact that the scraper used on all machines, leaves the top of the brick rough, which when dry is thinner on one side than the other; this objection is obviated in our machine by a very ingenious contrivance, which enables us to make brick with smooth surfaces, square corners, and of equal thickness when dry; the brick, as they come from the machine, are sufficiently pressed to hack from five to ten high, and in some clay can be dfied in the sun, but sure to dry under shedding without cracking in from two to four days; the clay is tempered the same as for hand-made brick—no sand used—thus giving a uniform color, will burn as well, and command a better price than hand-made brick; the thickness of the brick can be regulated by an adjustable track while running, producing bricks from two and one quarter, to two and three fourths inches in thickness, as the nature of the clay may require; our improved striker plate and propeller render this machine more durable, and less likely to break by stone; it is extremely simple in construction, and any man of ordinary experience can manage it. The improvements patented have all been thoroughly tested under the supervision of the inventor, which enables him to say that this machine will make brick in any and all clay that can be worked by hand. Opportunity will be given to all persons desirous of purchasing a machine to test it in their own clay, at our shops, before paying for the same."

Patented June 11th and Sept. 17th, 1867. Measures have been taken to secure additional patents upon improvements.

Machines and rights are for sale. For further information address either of the following parties: J. C. Basshon & Co., 26 Light street, Baltimore, Md., John W. Baker, Columbus, Ohio, or Horatio, Page, St. Louis, Mo.



SERGEANT'S PATENT BRICK MACHINE.

Pyro-tannin.

The following is from a recent patent by Dexter Symonds, of Marlow, N. H. The invention consists in burning spent tan bark, and in condensing the products of such combustion:

"In carrying out my invention I first provide an apparatus, in which the bark or other substances are consumed by regulated combustion, and in which the vaporized products of such combustion are condensed, collected, and drawn out for use. The particular construction or arrangement of the apparatus for burning the bark or other substance, is of no great importance, since any ordinary stove or furnace may be adapted for the burning operation, provided the draught or current of air can be controlled or regulated so as to produce rapid or ordinary combustion, and where the pipe or pipes, tube or tubes, arranged for conveying the smoke and vapor from the burning substance, pass into or through a condenser like a trough, filled with cold water, as described, which will condense the vapor, and produce my new and improved tanning liquid, which I call "pyro-tannin."

"This new and improved tanning liquid is produced in large quantities from spent bark, or bark which has been deprived of all its tanning properties that can be extracted by leaching, steeping, or other ordinary process, and the liquid produced or obtained from spent bark, by my process, is in every respect as good for tanning purposes as the liquid produced from fresh bark, and in my opinion, such improved tanning liquid obtained from spent bark, is superior to the tanning liquid obtained from fresh bark by leaching or by steeping or by other ordinary process.

"I do not confine myself to the use of spent bark for obtaining liquid to tan hides or skins, but I use fresh bark, or any other substance from which tanning liquid can be obtained by my process. In my new tanning process, and in the use of my new and improved tanning liquid or "pyro-tannin," for tanning hides and skins, after the hair has been removed from the hides by the liming process, or by any other well known process of removing said hair, the hides are then subjected to the action of the "pyro-tannin," prepared as above described, and without any intervening process between the liming and the tanning process. This pyro-tannin not only neutralizes the lime, but quickly penetrates and tans the hides in a superior manner, without injury to the fibres of the hide, and with a great saving of time in preparing and tanning, so as to produce good leather. Hides and skins are tanned by my improved tanning process without removing the hair or the fur, and without any other operation, except the usual soaking and fleshing of the hide. No other process of preparation is necessary to fit the hide or the skin for my tanning process, which produces much softer and tougher leather than the ordinary process of tanning. After the hides or the skins have been partly or wholly tanned by my improved process of tanning, and to change the character or the appearance of the leather, as to change the color or make the leather harder or stiffer, I remove the partly or the wholly tanned hides or skins or leather from the "pyro-tannin," and subject them to the action of ordinary tanning liquid, procured or extracted from fresh bark, by leaching or steeping, or by other ordinary process."

Pencil-Lead Mines and Lead-Pencils.

Every one knows what a black lead pencil is, but it is not generally known that there is not a particle of lead in the pencil. The material variously known as black lead, graphite or plumbago, is almost wholly composed of carbon. It probably owes its misnomer to the fact that previous to the employment of graphite for making pencils, common lead was used, and this within the present century. For a long time the best graphite was obtained, not in very large quantities, at Borrowdale, in the English county of Cumberland, where it was discovered in 1564, early in the reign of Queen Elizabeth, and pencils, much like those still in general use, were produced in the year following. As the supply of the graphite (known in Cumberland, while in the mine, by the title of wad), was not large, the British government, from the first, took great pains to prevent the exportation of the article, and even to limit its home sale to a supply just sufficient to meet the estimated demand. Graphite is found in various parts of Europe, and even in North America, but of very inferior quality. The Cumberland mines were worked only a few weeks in each year, yet the yield of wad was estimated at £40,000 a year. While the graphite lasted, England had a monopoly in supplying the best pencils to the world. Year after year, for a century past the graphite deposit in Cumberland became "fine by degrees and gradually less." The result was that graphite powder had to be compressed into a solid cake from which pencils could be supplied. A French variation, said to be an improvement, was to mix the powdered and purified graphite with clay, which is largely done still.

Nearly one hundred and fifty years ago, the pencil manufacture commenced in England, and improved in France, was transplanted to the village of Stein, near Nuremberg, in Bavaria, and, little more than a century since, Casper Faber there began to make the pencils which continue to be made by his descendants, and bear the family name through the world. The present John Lothair Faber, great grandson of Casper, has been head of the firm since 1839, and is not only very wealthy, but has recently been ennobled by the king of Bavaria. One of his brothers is associated with him at Stein, in the processes of manufacture; the youngest of the three, Eberhard Faber, represents the firm, for the Western World, at New York. Stein is literally a town of pencil factories, of which Baron Faber is the ruler, taking care of the health, government, education, industry, thrift, and amusements of the inhabitants, and always living in their midst. It may be asked—how do the Fabers make lead pencils without the famous graphite from Cumberland? It appears that twenty years ago John Peter Alibert, a Frenchman, resident in Asiatic Siberia, having heard of the gold discoveries in California, began to examine the sandy beds of various rivers flowing into the Arctic Ocean. He found samples of pure graphite, evidently brought a considerable distance by force of the stream, in one of the mountain gorges near Irkurtsk, and pursuing his discovery, tracked back to a branch of the Salan Mountain range, on the very summit of Mount Batougol, 275 miles west of the town of Irkurtsk, near the Chinese frontier, in the midst of the rocky desert, and found pure graphite. After years of costly labor Alibert found an exhaustless deposit of graphite equal to the best ever taken from Cumberland. Beside decorating and rewarding him, the Russian government changed the name of Mount Batougol to that of Mount Alibert. Nearly every crowned head in Europe has honored him. With the consent of the Russian government, Alibert now supplies Faber's house exclusively with graphite from the mine in Asiatic Siberia. Pencils of this material were first made by Baron Faber in 1861, and were not introduced into the American market until 1865, from which time artists and others perceived and acknowledged their superiority. If the world were to endure a thousand years more, there is sufficient graphite in Mount Alibert to supply its population with good black-lead pencils. —*Philadelphia Press.*

ALL the diamond cutting in this country is done by one firm in Boston, and their business is confined to the re-cutting of stones which have been nicked or otherwise rendered imperfect.

A sycamore tree one hundred and ten feet high, with a hollow fourteen feet in the clear, is reported to be standing in Calhoun county, Ill.

ELEGANCE OF DESIGN AN ELEMENT OF UTILITY IN MACHINERY.

There are many who declaim against anything that seems to them of "no particular use," and whose narrow and sordid views blind them to the value of beautiful objects, valuable simply because they are beautiful, but to such it is not our intention to address ourselves. It is foreign to our present purpose to attempt a demonstration of the æsthetical needs of the human intellect, or to show that their proper gratification is necessary to the mental and moral health of mankind. To an intelligent and thoughtful student of mental and moral science, we should as readily attempt to prove that the body needs to be nourished and warmed, and rested when weary. But there is another class still, who admitting the necessity of a cultivation of a taste for the beautiful, yet fail to appreciate the advantages which result from the combination of the beautiful with the useful. That an artist should spend weeks in perfecting a landscape painting, or that a carpet manufacturer should pay large sums for designs, in order to improve his wares, seems to them perfectly reasonable; but that a hoe, or an ax, or a plow, should be made a subject for tasteful decoration, is in their opinion an absurdity. The piano should have carved legs, but the cooking stove—why should that be ornamented? We propose in the present article to notice briefly the benefits to be derived from a proper attention to the combination of the beautiful with the useful, and also to show that in judicious attempts to make this combination, the highest degree of usefulness in construction will be most likely to be obtained.

The most important advantage to be found in the union of beauty with utility is the increased dignity it confers upon labor. In this both the manufacturer and the one destined to use the product of his skill share alike. The first feels himself elevated, and he is elevated, in the effort to beautify his production; the second is also elevated by the use of the more elegant and shapely implement, and is stimulated to attempt more excellent work on his own part, and this attempt dignifies and sweetens his toil. Who doubts that were fifty girls employed in an establishment with fifty others, one fifty to be supplied with nicely ornamented sewing machines, placed in a tidy and handsome apartment, the other fifty to be supplied with machines of the plainest patterns, situated in a rude and uncleanly room, who doubts that a feeling of superiority on the one hand, and of inferiority on the other, would soon spring up? And who that has any knowledge of human nature but could predict with certainty in which of the two apartments would more and better work be accomplished. Nor would the superiority or inferiority be imaginary, it would be real, and in each case progressive. As long as the causes which produced it should be permitted to exist, the difference between the two classes of operatives and in the quality of their work would increase, within certain limits, until the divergence would reach its maximum point in refinement of the one, and the degradation of the other class. Similar causes have produced the different gradations of modern society, and the history of the world shows that in the gradual transition of the human race from a state of barbarism to one of enlightened refinement, the increased taste for the beautiful combined with the useful, is a sure index of the degree of advancement, attained to at any period in the existence of a nation.

A new mill was to be erected in a large manufacturing town a few years since. The superintendent of the works with the sanction of the company who employed him expended large sums of money in the adornment of the grounds and in architectural display. But in the room usually styled the "weave shop," he was especially lavish. Beautiful mirrors of large size in fine gilt frames with marble wash basins and spacious wardrobes were placed at one end of the room. The gears were boxed in with mahogany, and nothing apparently was omitted which could add to the comfort of the operatives or to the general appearance of the room. His shrewdness and knowledge of human nature were rewarded when (as he quaintly remarked to us once in a conversation upon the subject), "he had skimmed the cream of the help in the entire town, and not another establishment could get them away from him."

A steam engine nicely ornamented and tastily designed, will be found nine times out of ten to wear longer, and to be kept in order with less expense, than one made in the cheapest and plainest style. Better care will be taken of it, because the pride of the engineer will be enlisted to render him vigilant and careful. The same is true of all machinery, and when an operative can be made to take a pride in his machine and in his work, there is little fear that his duty will be neglected.

We have thus attempted to show that judicious ornamentation in the construction of machinery is an element of utility on account of the effect produced upon the workman who is destined to operate it; and we think it will not be difficult to show that the same cause generally results in the production of a better machine than would be produced if a proper consideration of taste in construction were entirely neglected. To do this, only a brief consideration of the nature of the beautiful, and a very partial analysis and examination of its elements will be found necessary.

One of the most important of all the complex ideas and emotions which constitute a sense of beauty, is the full appreciation of the perfect adaptation of an object for the place it is to occupy or the purpose it is designed to subserve. In other words a sense of fitness is a part of the feeling excited in us by the sight of beautiful objects. Many things which at first sight are repugnant to our conceptions of beauty, become beautiful as soon as the sense of their adaptation to some definite purpose is felt. A striking illustration of this truth occurred to us while passing through the machinery department of the World's Fair, as it was called, held in New York in 1853, in company with a friend whose inventions have since made his name familiar to every mechanic in the country. We paused before what seemed to be a huge mass of cast iron, certainly not purposeless, but seemingly without proportion, and to an ordinary observer an unsightly and exceedingly unattractive object. Upon inquiry we found that it was a part of a powerful cutting engine, destined to be used in cutting the teeth of huge gears in one of the largest marine engine manufactories in America. Imagination at once supplied the remaining details, reversed the position of the enormous casting, attached to it the ponderous pulleys and fly wheel, and perceiving the design of every bulky projection forced from us a simultaneous exclamation of admiration. In this instance what was at first apparently rude in substance and uncouth in shape, become interesting through a knowledge of its ultimate purpose; beautiful in the strength and grandeur of its massive and just proportions. So in nature, rude masses of rugged and to the casual observer unsightly rocks, are to the artist, features of beauty in landscape, to the geologist, sublime chapters in the history of the universe. So much this truth impresses itself even upon those who are most utilitarian in their views, that they are in practical life, unconsciously influenced by it. In purchases, one of this class would, all things else being equal, incline to the most beautiful article in a collection of goods, not because they were sensible that it was more beautiful than others, but because in their minds the superior comeliness would produce the impression of superior quality. Those manufacturers who have recognized this mental peculiarity have outstripped and will continue to outstrip less wise competitors.

Conceive a wheel with the large ends of the spokes attached to the rim, and the small ends to the hub; or the connecting rod of a locomotive of equal size throughout, or smallest in the middle. Now fancy a man who had never seen these things, but who had in some way acquired a fine taste for beautiful forms, setting to work with the sole view of improving their appearance. Would he not be likely to hit upon such forms as would not only add greatly to their beauty but also to their strength, most probably without taking anything into consideration except the idea with which he commenced his task, he would finally reach and retain the forms at present used for those objects. For in such things the appearance of strength can only accompany real strength, and in them strength is an element of fitness, and fitness, we have already seen, is an element of beauty. In machinery it may perhaps be as truly said that "beauty is strength" as that "strength is beauty."

Especially should attention be paid to the appearance of machines which are now claimants for public favor. The successful introduction of a new invention depends more upon this than is usually imagined. Many a worthless invention has realized something for its inventor because it looked as though it was valuable, while many a good and useful invention has been neglected because its appearance and finish were not such as would readily attract attention and inspire confidence. Would all inventors realize the value of the advice we give them, we should hear of fewer disappointed hopes and of more frequent successes.

Case-hardening Iron.

Thomas Sheehan, of Dunkirk, N. Y., has patented the following:—

"In a suitable cast iron box put a layer of broken limestone, two inches thick. Over the said layer place a perforated plate. On the plate I next put a layer, of about two inches in thickness, of a mixture made as follows:—200 parts charcoal, saturated with water; 30 pounds of muriate of soda; 12 parts of sal-soda, pulverized; 5 parts of rosin pulverized; and 5 parts of black oxide of manganese. The ingredients thus specified well mixed. I now take the iron intended to be steelified, and put it on the top of said mixture. Another layer of the mixture is now put on the iron, and alternate layers of iron and mixture supplied until the box is filled, always finishing with a heavy layer of the mixture. Care must be taken to prevent the iron designated to be hardened from coming in contact with the iron box. Lute the cover of the box with a mixture of yellow clay and sand, with a little salt in it to keep it from cracking. The box will now be put in an open furnace, suitable for the purpose, and a fire made of hard coal and wood, and keep the box subject to strong heat from two to seven hours, according to the size of the box and the bulk of iron. As the heat increases, the carbon will be expelled from the limestone in the bottom of the box, and will unite with the oxygen and carbonaceous ingredients of the charcoal compound as aforesaid, and will convert the iron in the box into steel on its entire surface. I then take said iron out of the box when it is of a bright cherry red, and chill it quickly in a large vessel of cold, clear water. The surface of the steelified iron will now be smooth, and free from scales."

Improvement in Fire-proof Safes.

Patented by Edward H. Ashcroft, of Lynn, Mass. "I place in the inner perforated compartments of a safe, metallic tubes or vials filled with a liquid acid, (sulphuric acid, for instance,) one or both ends of such tube or vial being stopped with an easily fusible alloy. I surround this, and place in immediate contact with it, bicarbonate of soda. I then put into the compartments a large proportion of carbonate of ammonia, or other volatile salts.

"When the safe becomes heated to about 212° F., the above mentioned fusible alloy melts, thus opening the vial; the acid runs out, and, coming in contact with the surrounding bicarbonate of soda, immediately eliminates carbonic acid gas, which fills the safe and is non-combustible. The evolution of this gas having ceased, if the safe is still longer heated, the carbonate of ammonia or other volatile salt vaporizes slowly, and, being also non-combustible, protects the contents of the safe."

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Correspondence of the Sun with the Clocks.—Sidereal Time.

MESSRS. EDITORS:—Allow me to add a few words in further explanation of one of my former articles on this subject, and at the same time to correct a statement made. The best way in which the mean time is obtained every day of the year is by the sidereal days, which consist in the time of apparen revolution of the stars around our earth, and are always perfectly uniform (unlike the solar days); therefore the sidereal days have always the same length, consequently the time obtained by a clock regulated to sidereal time corresponds always with the motion of the fixed stars, without any deviation, except by the aberration of light, as I explained elsewhere in this paper. As now the stars revolve nearly 366¼ times in a year, and the sun 365¼ times, the siderial day is 366¼ part shorter than the solar day, which makes three minutes and 56 seconds nearly, for each day. The passage of a star in Aries through the meridian, has been adopted as the beginning of every sidereal day, and its passage on the 21st of March as the beginning of the sidereal year; as now on that day the sun occupies that very same part of the heavens and therefore passes also the meridian at the same time, it causes the solar and sidereal time to coincide; we have, then, to add 3′ 56″ nearly at 12 M. for every day afterward in order to find the mean midday of the solar day. In this way, in an astronomical observatory the solar time may be found for any moment, by means of a clock giving sidereal time, which clock in its turn may be regulated every night by observations on the stars.

The chief cause now that the solar time, directly proved by the sun's shadow, does not correspond with the mean solar time calculated from sidereal time, and also given by a well regulated clock, is (as I stated) the irregular yearly motion of the earth in its varying distance from the sun, and also the inclination of the earth on its axis has an influence in this phenomenon, which, however cannot be well explained without geometrical figures. This statement may serve as a correction for an expression inadvertently made in the beginning of my former article. V.

New York City.

Storm Theories.

MESSRS. EDITORS:—The theory of Doré, Reid, and others, is what is called the cyclonic theory, in which it is maintained that the storm revolves about an axis, while it is moving over the surface of the earth. The progressive movement of the center of disturbance varies from fifteen to forty miles per hour; while the velocity of the wind around the center is sometimes eighty, ninety, or one hundred miles per hour. The area over which storms extend is seldom less than six hundred miles in diameter, and is frequently much larger, often covering many States. From the examination of some hundreds of storms, in Europe, their form was found to be circular; while in this country they are often more elongated, and their outline sometimes irregular. There is, however, no theory yet discovered that will satisfactorily account for all the facts in the case. Very much remains to be done before all the laws which govern the disturbances of the atmosphere, and its attendant phenomena, will be accurately ascertained.

The prediction of these violent commotions has been a great desideratum from time immemorial; not only to the sailor, but to the farmer, and to all classes of society. Scores of lives and a vast amount of property are lost every year by storms, a large part of which might be saved if the approach of danger could be known a few hours before its arrival. Notwithstanding all the signs and astrological predictions which have been more or less current among mankind, very little has yet been done toward furnishing the world with any safe and reliable means by which they may know when to expect storms long enough before hand to give time for preparation. The interest which has been taken in meteorological observation and the benefits resulting from it are encouraging, and sufficient to point out the direction in which we are to labor if we ever succeed in predicting the approach of storms. After the loss of 60,000 lives and the damage done to the shipping in Calcutta by the storm in October, 1864, the British government established a system of telegraphic meteorological predictions in India, similar to that which was established in this country by the Smithsonian Institution in 1856.

"The information conveyed by telegraphic dispatches in regard to the weather was daily exhibited by means of differently colored tokens on a map of the United States, so as to show at one view the meteorological condition of the atmosphere over the whole country. At the same time publications of telegraphic dispatches were made in the newspapers." [Smithsonian Report, 1865.] It is to be regretted that this system, which was discontinued during the war, has never, to my knowledge, been fully re-established. A committee appointed to consider certain questions relating to the meteorological department of the Board of Trade in England, recommends the appropriation of £10,450 or $52,250 for the successful carrying out of this system. I am glad to learn that this Board of Trade has just established five observa-

tories in different parts of England and Scotland, in which are self-recording instruments, all of similar construction. "A full and accurate record of atmospherical phenomena, supplying, it is hoped, a secure and adequate basis for the discussion of the variations of the weather in the British Islands, will be set on foot. The committee are prepared to convey telegraphic intelligence of the existence of any serious atmospherical disturbance which may come to their knowledge, to all ports to which it appears to them that such information would be of importance. On receipt of such message the local authorities are expected to hoist a drum as a general warning, on seeing which masters of vessels or others interested may learn, by inquiring at the local office, the precise nature of the information received." As most of the meteorological phenomena of the North Temperate Zone pass from west to east, it is evident that this country must afford a much better field for observation than England or any of the west of Europe. And as nearly all the principal cities of America as well as those of Europe are now, or are rapidly coming into telegraphic communication with each other, and the two continents are bound together, it seems highly necessary that some uniform system should be adopted on both continents. This would enable us not only to discover the laws and causes of many interesting phenomena of storms, which would materially advance the interests of science, but would also secure many practical advantages which must be apparent to all. If the attention of Congress has not already been called to this subject, this would seem to be a proper time to urge upon that body the necessity of making an appropriation for the establishment of observatories, etc., in different parts of the country for the carrying out of some system of observation and sending dispatches, as above indicated. Such an undertaking must result in benefits, not only to America, but to the world.

P. H. DOWLING.

Medina, Mich.

The Manufacture of Porcelain Teeth.

MESSRS. EDITORS:—Perhaps but few persons stop to consider the rapid growth and extent of this business in the United States. If we search for the germ of this comparatively new subject of production and sale, we shall be obliged to go some distance. I have seen a tooth taken from the alveolus of an Alexandrine mummy (some leek-eating cotemporary of Pharaoh and Moses, may be), brought by Dr. Gliddon, which had been plugged with gold. Occasional hints are furnished to us by other explanations, that our ancestors attempted the preservation or replacement of lost grinders, but the evidence is so distant and so uncertain, that they must be considered rather as occasional incidents than reliable details. Human nature, always ashamed of the ravages of time or the effect of accident, has been faithful to its instincts, and men and women have disguised the loss of an incisor by bits of bone or other material. Ivory was, until lately, the favorite substance to be used as a substitute for a decayed molar. Volney, Chateaubriand, and the elder Pitt, were not ashamed to make their countenances look sightly by these artificial replacements. I once heard the late Rembrandt Peale account for the material difference that appeared in the two pictures of General Washington, one of them having been painted when the false teeth were in his mouth, and the other when they were out. Washington's teeth were made of bone, and so were most of artificial substitutes forty or fifty years ago, but it soon became evident to "tooth sculptors" that something less liable to decay was necessary, and our French neighbors deserve the credit for devising the present popular substitute.

About the year 1765, one Pierre Lavouse, a workman from the Imperial Porcelain Works at Sevres, made some rude imitations of the natural teeth, and made them of the same material of which the French and German "soft porcelain" is made, but the art of making artificial dentures languished, until the incident I am about to detail transpired in 1833, sixty years afterwards.

At the date I have mentioned there was a little store in Second street, in this city, which was occupied by a man who did a little in dentistry, and eked out a living somehow, by mending watches, selling spectacles, etc. The education of the owner of the little shop was defective, and he devised all kinds of expedients to produce some substance to be used in lieu of bone from which to make the artificial teeth. He was at his wit's end, when one evening as he was closing his shutters a drunken Hollander, named Van Pelt, staggered into the place. The man was well acquainted with the manner of making porcelain, and for twenty-five cents offered to instruct the repairer of old watches, so that he could make porcelain teeth. Van Pelt wanted his whisky. The ambitious dentist embraced the offer, paid the Hollander the "quarter" and the next day burned his face and fingers by beginning to make molars for the million. So strangely do small causes operate.

From this visit of the ingenious drunkard we may date the origin of this kind of manufacture in the United States. After forty years of vicissitude and experiment the amount of labor and capital in this hitherto new business must astonish the statistician. The Revenue Tax paid to the government upon this branch of manufactures exceeds a quarter of a million dollars yearly. More than six hundred men and women—exclusive of dental-chair makers, quarrymen, instrument makers, gold-foil beaters, plaster of Paris makers, makers of tin foil, of vulcanizers, of emery and corundum wheels, etc.—which, with their families, make an aggregate of say five thousand souls, enough to make a village of sufficient size to claim the honors of a Burgess or Mayor—get their bread from this source alone. The capital invested in this business furnishes no mean item of the social wealth. In passing through these factories you miss the machinery, the ponderous iron wheels visible in other manufactories, but your custodian shows to you a pile of brass, and as he clanks the iron door open, tells you that these are his "molds." Little things they are, weighing a pound or so, but as each of them is worth a hundred dollars, and as there are some thousands of them, they cost something, you see, *mon ami*. And the furnaces, too, huge structures sixty or seventy feet high, built with care and skill, and lined with soapstone, excite curiosity.

The constituents, or, as the profound call them, the "molecular atoms," which make an artificial tooth, are few and simple. Feldspar, silex and kaolin, and a little flux, make the body and enamel, and the particular tint and color are imparted by some of the oxides of metals, the oxide of silver, making a straw or lemon color, iron making a brown, cobalt a blue, titanium a yellow, etc. Sometimes the colors are imparted with a brush to the surface of the tooth, but usually the color is mixed with the "body" or the mass of the materials before it is molded. The most difficulty is experienced in preparing the gum color. This substance, called "Purple of Cassius" by the chemists, appears to be a sort of *terra incognita* to the students in that science. They conjecture that it is an oxide, but all of them hesitate in assigning a name or chemical symbol to this production. To make the gum color natural and flesh-like is the *point d'excellence* with manufacturers of artificial dentures. We suppose that the truth is that its purplish flesh-color which makes it so desirable is imparted to it by the admixture of some substance in the "body" of the tooth upon which it is burned. Some manufacturers make this purple of Cassius by melting their gold, tin, and silver in a crucible. This is called preparing it in the "dry way," and some make it by dissolving the metals in acids, which is called the "humid" process. In any way it is uncertain and undetermined, and when a good "lot" is made the manufacturer rejoiceth, vastly.

The crude feldspar is scattered in patches all over the globe, but the best quality used in the United States is brought from the quarries in Delaware Co., Pa. The kaolin which is neither more nor less than disintegrated feldspar is procured from the same places. It may be necessary to say that the feldspar contains about fourteen per cent of potash, which it loses in the process of disintegration; consequently kaolin, or *petunze*, as the Chinese call it, is feldspar deprived of its alkali. The silex is too common to need explanation, as its relations, flint, quartz, sand, etc., are under every one's heels.

The spar is quarried, brought to the factories in barrels, heated in a furnace, and the calcination is completed when it is thrown into water. Next, it is ground in water, and kept standing in vessels for two or three years, during which time a film rises upon the surface of the water which emits a stench not pleasant to dainty noses. (We are told that the feldspar is kept in water in the Imperial Porcelain Chinese manufactories for three hundred years!) It is next dried, and after being mixed with the silex and kaolin to about the consistence of putty, is pressed into the molds and takes the form of the "block" or single tooth, and placed upon clay "slides" and "biscuited," *i. e.*, heated to a degree which makes it hard enough for the workmen to trim the edges of the teeth or blocks and yet not sufficiently hard to become fused, or vitrified. After the edges are trimmed off, they are dipped in a glass and replaced upon the slides and are returned to the muffle where they are again heated to about 4,000 degrees, and when properly vitrified, are taken out and annealed very slowly. This last process demands experience and good judgement. Like all other kinds of glass, porcelain teeth that are not carefully annealed are worthless. When the teeth have been properly made, and all the essentials of strength and beauty have received due attention, they are as translucent as the finest Chinese Porcelain, and as tough as ironstone. I have avoided details as it is not my purpose to instruct in this business, but rather to call attention to the rapid rise of this noticeable feature in American manufactures.

Forty years ago you could have your face shaved, your tooth drawn, and your boots blackened, in the same place by the same hand. Now you are ushered into an elegant office, seated in a chair easier than that of Heliogabalus, and your alveolar ridges are examined by a man whose attainments would reflect honor upon any profession.

GEO. R. WELDING.

Philadelphia, Pa.

Change of Tone in the Sounds of Moving Bodies.

MESSRS. EDITORS:—I wish to confirm the statements made by your correspondent "G. C.," given upon p. 247 of this volume. I have often noticed such a change of tone as is there described, in the screech of a passing locomotive, nor is it difficult of explanation.

The tone or pitch of any sound depends upon the rapidity of the sonorous vibrations, the higher the pitch the more rapid the vibrations. Those produced by the locomotive whistle probably range from 100 to 500 per second, in different locomotives. Let us suppose the vibrations are 200 per second. Then since sound travels in air about 1100 feet per second, each wave will be about five and a half feet long. If the locomotive is approaching at the rate of twenty miles per hour,—which is about thirty feet per second,—we shall hear five more vibrations per second than actually occur; during that time, the locomotive having appproached by a distance somewhat greater than the length of five of the sonorous waves. On the other hand, when the locomotive is receding we hear five vibrations less instead of five more, making a difference of ten vibrations in a second, or one twentieth part of the whole number generated by the whistle; a difference, —amounting to nearly a semi-tone,—amply sufficient to cause a very perceptible change of pitch.

If the locomotive does not approach or recede, that is, if it moves in the arc of a circle, in the center of which the hearer is situated, the pitch of its whistle will be the same as when the locomotive is stationary; but, under all other circumstances of motion, a change of tone, corresponding to the rate of approach or recession, is inevitable.

The elevation in tone of an approaching rifle ball or other projectile will of course be still greater, approximating in amount to an octave, in which the number of vibrations is doubled when the velocity of the projectile approximates to 1100 feet per second, or the velocity of sound itself. In receding, the tone will be depressed a corresponding amount. If the velocity of the projectile exceeds 1100 feet per second, it will not be heard at all on its approach, or it will leave all the sound waves behind it.

An explanation somewhat similar to the one given above, as relating to variation in sound, was proposed in *Silliman's Journal* a few years ago, to account for the change of color in the variable stars. When a star approaches the earth with a velocity having a sufficiently large ratio to that of light, its color would assimilate to the violet, in which the vibrations are the most rapid of all the colors. When its motion changed to an opposite direction, as would be the case of a body moving in a circular or elliptical orbit, in a plane but little if any inclined to the direction of vision, a contrary effect would take place, and the color would change through the entire spectrum to the red, in which the vibrations are the slowest which produce the sensation of vision.

HENRY F. WALLING.

New York City.

Depositing Crystals on Glass.

MESSRS. EDITORS:—Noticing an article in No. 18, Vol. XVIII., entitled "Crystallization," reminded me of some experiments of a similar nature made in the summer of 1865. I was then engaged in the photographic business, and had a window opening from my dark room into the operating room. Thinking I would make it ornamental, I procured a pint of stale ale, four ounces of Epsom salts, and a small vial of Magenta colored liquid. I then took out the window, and in its stead placed a large single pane. After mixing a saturate solution of the ale and salts, and adding the color, I filtered the solution, then cleaned the glass with alcohol and cotton chemically clean, placed it on a leveling stand, and made a small ledge with putty around the edge, then poured on the solution enough to cover the plate evenly in all parts. In a few hours the crystals began to form around the edge, and in forty-eight hours it was all covered with the most beautiful crystals, of large size and of a rich purple color. When it was perfectly dry I placed it in the window, where it remained all summer, and was the wonder and admiration of the curious. But when winter came, and the stove was put up close to it, it soon began to lose color, and the crystals gradually dropped off.

I offer this for what it is worth, but do not claim the discovery, as it first came under my notice on the prescription case of a druggist's window.

H. B. NORTON.

Rochester, N. Y.

Novel Way to Fill Teeth.

MESSRS. EDITORS:—In No. 17, current volume, I notice the statement of a dentist of Zanesville, Ohio., who had extracted and replaced a molar tooth for a lady, which had done good service for the space of 11 years, and now had to be again extracted, being found aching from an exposed nerve. What is singular about it is that the nerve, after having been broken, should again reunite; I do not see how this could be possible.

A short time previous to that spoken of by him, while I was practising dentistry in Ohio, a young woman applied to me to fill the cavities in two large incisors. Upon examination I found them so far gone that the task to me would be very difficult, and to her too painful to endure. The surroundings seemed to be sound, with but slight inflammation, so I made the novel proposition to extract, fill, and replace them, to which she consented. I prepared a small vise, fitted the jaws with soft pine, and after getting everything in readiness, I placed her slightly under the influence of chloric ether and extracted the one which was worse decayed, found the lingual surface nearly gone. I placed it in the vise, cleaned it, making the orifice entirely through and consequently had to fill from the inner angles on each side, all of which I performed in about five minutes, when I again administered a little ether, replaced said tooth and extracted the other, and proceeded as with the first, which occupied three or four minutes, the whole being performed inside of ten minutes. I lately heard from her; the teeth remain as sound as they were when I filled and replaced them, doing good service. Any doubting dentist can satisfy himself of the truth of this statement by applying to the lady herself, Susan Liddill, who resides at Union Village, Warren county, Ohio. The nerve in one of these teeth was dead before the tooth was extracted, and both of them doubtless received their nourishment from the surrounding alveolar process. How long they may be nourished from this source and be of service is yet to be determined.

I tried the experiment on a young man, which also proved a success, but it has been some years since I heard from him. I also tried with others partially decayed bicuspids and molars, but did not succeed in getting them into paying service, as they had to be re-extracted in a short time. But I do not see why a perfectly sound one might not re-unite with the alveolar process or surrounding walls and thence receive nourishment and become serviceable.

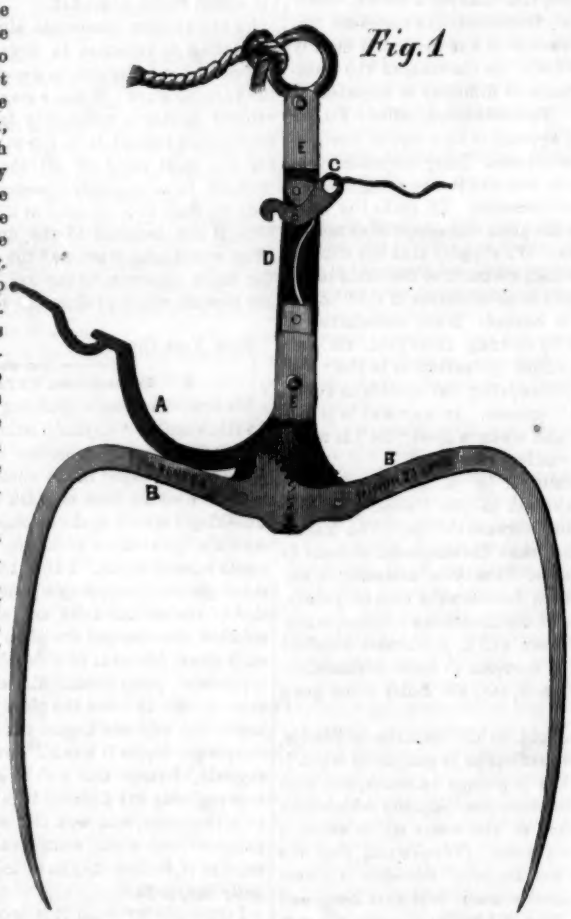
H. L. EADES.

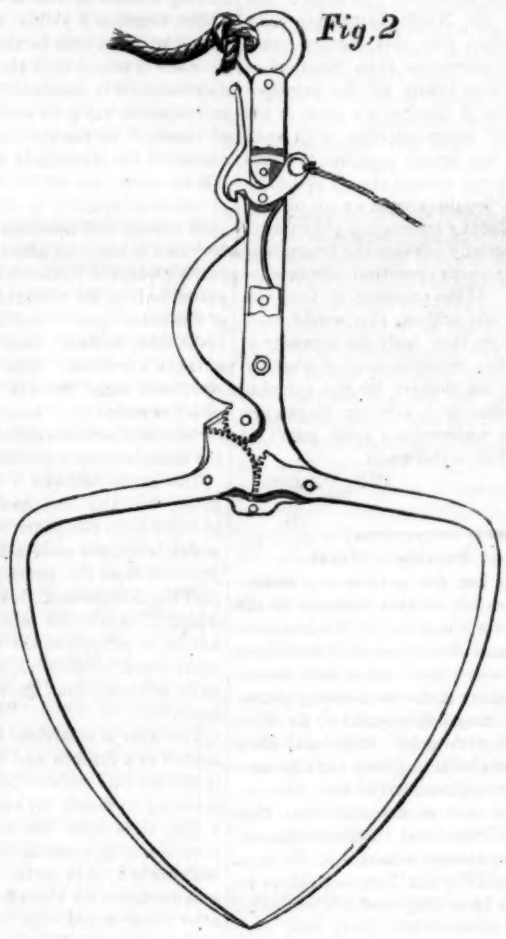
A piece of land in the Virginia valley is said to have been planted in corn for sixty-five years in succession, and still grows a good crop.

Improvement in Self-Acting Horse Hay Forks.

In the accompanying engravings is presented a new cog-wheel hay fork, the invention of P. A. Mowers, of Shippensburg, Pa.

Fig. 1 represents the fork open, as in its descent from the mow or stack to the loaded wagon. A is a lever gearing with the prongs; B B are the prongs; E E the clasps or plates (section broken) in which the cogs of the segment ends of the prongs and lever work; D is a spring attached to the trip, C, which fits securely into a notch of the lever. The manner of its action is simple, and at the same time effective. The curvature of the prongs is such that, as the man loading presses the fork downward into the hay with his foot, they describe a circle until they meet. During this time the lever is brought up by the action of the cogs ready to be locked, although not touched until now, when the person controlling the fork, by grasping the lever with his hand, readily locks it by a slight pressure against the trip, which flies into the notch of the lever, and the fork is locked as seen in Fig. 2, having within its grasp from 300 to 600 lbs. of hay. As quickly as the hay arrives at the point where it is desired to drop it, the off-snap rope attached to the trip is pulled, which releases the lever, the hay from its own weight drops out, and the fork is returned to the wagon, open, as in Fig. 1.





MOWERS' IMPROVED HAY FORK.

Under the same patent a second variety of fork is included, in which the lever, A, is omitted, and the prong of the opposite side made to coincide with the length of the lever. In other words, this is a horse-setter in which the main rope, spring, and trip are adjusted a little differently from the former. Instead of suspending the fork from a ring, as in Fig. 1, there is a pulley between the plates, E E, under which the rope passes, and then is attached to a hook on the prolonged prong. The principle of its working is the same as the fork already described; and the only advantage it possesses over the lever-fork, is a moment's time saved in locking, as the horse locks it is pulling. Still another variety of fork may be made, in which the lever is placed outside the plate. Either of these forks may be constructed with two or four prongs.

After many and impartial trials of the cog-wheel hay fork, the inventor claims superiority for it over all others in its perfect adaptibility to all kinds of hay—short or long, wet or dry. It may also be used for loading straw and cotton.

The patent was issued March 23, 1868, to P. A. Mowers, Shippensburg, Pa. A firm is desired to manufacture on a royalty for the states of New York, New Jersey, Delaware, and for New England. For particulars, address S. M. Whistler, Albany, N. Y. State and county rights for sale. For further information, as to other states, address the patentee, P. A. Mowers.

JOHNSON'S SELF-FASTENING BUTTON.

The annexed engravings represent a self-fastening button, which can be attached to a garment in a twinkling without the aid of a needle or thread, and can be detached in as little time. They are easily made by the usual mechanism, the tubular shank of the button being raised from the button itself. In the sectional drawing of the button, F represents the shank, its lower end being provided with a slot corresponding with the width of the stud, A, which enters therein. The inner face of this lower end has a recess or depression in a direction opposite to the opening, so that when the stud is turned after entering the shank, the shoulders of the barb will rest in the depression. D is a disk or back plate from the center of which rises a shank, B, terminating in the barb, A, which pierces the cloth, E. A spring of rubber or other suitable material, C, serves to keep the button and stud apart thereby keeping the shoulders of the barb in the depressions before referred to.

The other engraving shows the button when attached to the cloth.

This button was patented by John M. Johnson through the Scientific American Patent Agency, May 15, 1866, and any further information may be obtained by addressing him at Box 45, Station D, New York city.

Improvement in Printing Wall Papers.

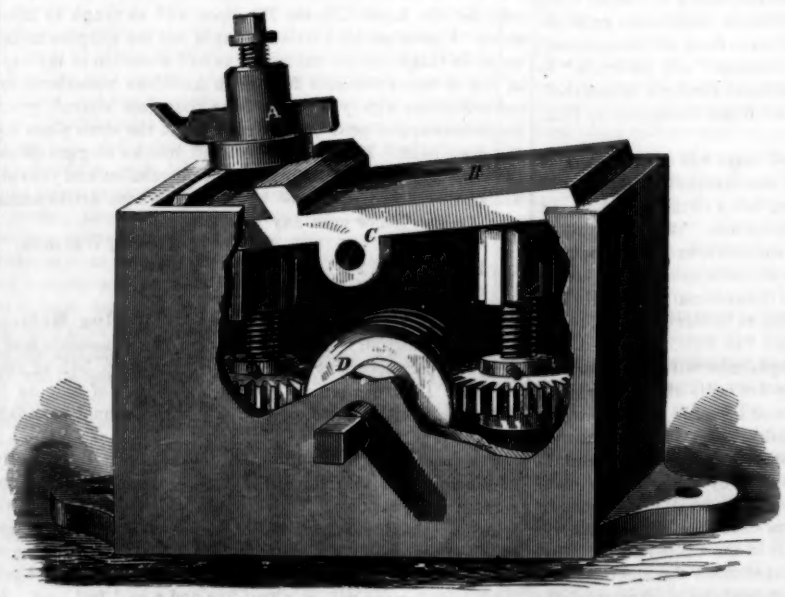
P. H. Bowers, Brooklyn, N. Y., has patented the following:

"I take thin strips of wood, of various kinds, from which I desire to print the wall papers, and mount them upon blocks of wood, or any suitable substance; or I saw out from wood, blocks of sufficient hight to allow an impression to be taken from them when placed in the press. I then thoroughly cleanse the face of the wood blocks with a mild alkaline solution, so as to remove the softer substance filling the pores of the wood. The blocks are then placed in the ordinary machine for printing wall paper, are properly inked, and the paper, being fed into the machine, any number of impressions may be taken.

"The result is the production of a wall paper, in which the grain of the wood used as a type is perfectly reproduced, and the expense attendant upon the same does not exceed the cost of wall paper printed in the usual manner, while a high artistic character is given to the work."

Improvement in Tool Holders for Lathes.

The device herewith illustrated is intended to take the place of the ordinary tool post used on turning lathes, with the object of holding the turning tool rigidly to place, which it is difficult to do with the device in common use. These support the tool only on one end, but this is calculated to sustain it solidly along its whole bearing. The tool post, proper, A, is attached to beveled ledges on the platform, B, in the usual, manner, the platform forming with the tool post, a single device.



GEISSINGER'S PATENT LATHE TOOL POST.

This platform is pivoted to the sides of a box by the ears, C, through which passes a bolt. The box contains a worm, D, and two worm gears, one on either side of it, with both of which it is permanently engaged. Of course there can be no back lash in such a case, and when the worm is turned the gears operate simultaneously. One of the gears carries a screw elevating one end of the platform and the other carries another, performing the same office for the opposite end.

Patented Sept. 17, 1867. Further information may be obained of Elijah Hall, 145 Smithfield street, Pittsburgh, Pa.

Immortal Animals.

Up to the present the law *omnibus moriendum est* has never been controverted, but it seems that it is reserved for science and research to call this immutable dictum into question. It will scarcely be credited that there are animals or at least portions of animals which never die; but, nevertheless, such is the fact with respect to certain marine worms of the genus *Nais* and *Syllis*, possessing but little interest for the cursory observer, but presenting many attractive features to the naturalist and zoologist. These little creatures are endowed with the singular property of multiplying their species by self division. A similar power of procreation is common in many species of the animal kingdom, and also in the vegetable, but in this particular genus it manifests itself in a more remarkable manner. At certain periods in the life of the worm the posterior portion of the body becomes considerably changed in form, increases in size, and the transversal lines dividing it into segments assume a more prominent and marked appearance. After some time, at the point where the anterior and posterior portions of the body join, there is formed a head, with *antennæ* jaws, and, in fact, with every other physical attribute that constitutes a complete marine worm of the particular species alluded to. No sooner is it entirely finished than it detaches itself from the mother body, so to speak, and launches itself out into the world to become, in its turn, subdivided into independent creatures. It is but right to state that these facts have been contested, but they are in strict accordance with accurate observation and disinterested testimony.—*The Engineer.*

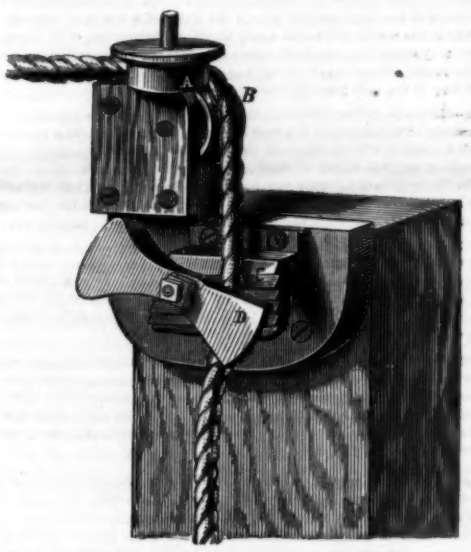
The Travels of a Telegraph Cable.

The submarine telegraph line which is to connect the islands of Cuba and Jamaica with Panama, can boast of quite a history. It was originally manufactured in London to connect Asia and America by way of Behring's straits, and was shipped to Victoria. But the success of the Atlantic cable was the death blow of the Pacific company, and the cable was not unshipped. The East India Telegraph Company then proposed buying it, to be used in China, but the negotiation failing, it was ordered to California. Before, however, it could be appropriated other parties came in and purchased it, and now, never yet having been disturbed since being shipped from London in 1865, there seems every probability that it will finally find a resting place, filling its ultimate mission as a link in completing communication between the United States and the isthmus of Panama.

THE cities live at the expense of the country. Families are exhausted and die out and their places are filled by new comers from the country. This was illustrated by the case of Paris, where it was estimated by a writer in 1842, that among 300,000 people then living in Paris, there were probably not 1,000 who could trace their families in that city back 200 years; or, the 200,000 people living in Paris in the reign of Louis XIII., instead of multiplying to 400,000 in two centuries, had dwindled down to 1,000. According to Price, 10,000, and according to Hume, 5,000 people from the country are necessary to keep the London population up to its number.

RIORDAN'S CLOTHES LINE HOLDER.

The object of the little article shown in the engraving is to overcome the trouble of putting up and taking down a common clothes-line, which is usually fastened by knots, the tying and untying of which is a matter often so annoying that the line is left up and exposed to all weathers. With this clothes line holder once set up, no further trouble can possibly be experienced in this matter, as all that is to be done in putting up the line is simply to pass the ends of it over the pulleys, A and B, one of which is vertical and the other horizontal so that the rope may run easily. The end is then pulled downward, until the line is brought to a proper tension, when it is introduced between the catching jaws, C D, by pressing it laterally to the left. The jaw, D, swings



loosely on its pivot, and when the line is brought against it and pulled downward it swings, and thus admits the line, which is now let go, and as the outer end of D is weighted, it immediately presses up against the line and prevents it from running backward. The two jaws are made with a slope in contrary directions, and both are corrugated to assist in holding the line. When it is desired to take down the line all that is to be done is to pull the end downward and sideways to the right, thus withdrawing it from between the jaws and letting it run back over the pulleys.

It will be seen that not only does it afford the easiest means of putting up and taking down the line, but also that the line can be tightened to any required degree, thus dispensing with unsightly center props, and the holder may be set at any hight from the ground, and can be operated with one hand with equal facility at whatever hight.

The working parts are of cast iron, mounted on a block of wood, for facility in setting up, and are very little larger than the engraving. For further information address the patentee, P. Riordan, Arsenal, Washington, D. C.

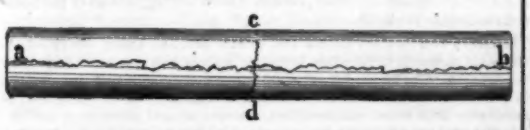
Patented through the Scientific American Patent Agency, Dec. 31, 1867.

THE WATCH.—No. 4 of the articles on this subject is unavoidably postponed until the next number on account of the pressure of matter upon our columns. We shall resume their publication in the next number.

ON THE STRENGTH OF BOILERS.

The capacity of boilers to resist rupture by the pressure of the steam, and the unequal expansion of the material of boilers from unequal heating, is a subject of very great importance, and not generally understood. Some illustrations and remarks relative thereto will be found below.

Any tube closed at the ends and subjected to an elastic pressure from within, will rupture longitudinally (from *a* to *b*) with about one half the force per square inch required to break it transversely, as from *c* to *d*.



For example, a cylindrical boiler, without tubes or flues, made of a single piece of homogeneous iron, one quarter inch thick, without seams, may be conceived, twenty feet long, and thirty-six inches in diameter. For convenience, we will assume that each square inch of the iron of the cross section, from *c* to *d*, and of the longitudinal section, on the horizontal plane, from *a* to *b*, has the ability to restrain a force having a tendency to rupture it, equal to fifty thousand pounds.

The circumference of the boiler is about one hundred and thirteen inches, consequently the area of the cross section of the iron has about twenty-eight square inches; it would, therefore, require one million, four hundred thousand pounds pressure against the heads to pull it apart with a transverse rupture. The whole number of pounds representing the transverse strength, divided by one thousand and seventeen, which is the number of square inches area of the heads, against which the steam would press to cause the transverse rupture, gives thirteen hundred and seventy-six pounds as the pressure per square inch against the head required to break such a boiler in two transversely.

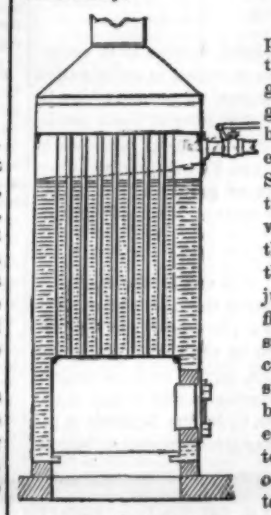
The longitudinal section contains one hundred and thirty-eight square inches of iron; consequently, it requires six millions, nine hundred thousand pounds pressure to break it in two in the longitudinal direction. The area of the surface against which the steam would press—the boiler being two hundred and forty inches long and thirty-six inches wide—is eight thousand, six hundred and forty square inches; which, used as a divisor for the sum of pounds, representing the strength to resist longitudinal rupture, and we have seven hundred and ninety-eight pounds per square inch, as the pressure necessary to pull it apart with a longitudinal rupture. Whether such a boiler could resist transverse rupture until the pressure of the steam reached 1,376 lbs. to the inch, and longitudinal rupture up to 797 lbs. to the square inch, is not material to this particular inquiry.

It is important for engineers and others to know, that a boiler is nearly twice as strong to resist transverse rupture as the longitudinal, because it will be then possible to determine that some other force than the direct pressure of the steam has been the cause, when a boiler is found broken transversely, and not longitudinally, all other conditions being equal, as contemplated herein.

If a boiler of the cylindrical form has flues, or tubes, it would increase the ability to resist transverse ruptures, for two reasons, which should be considered:

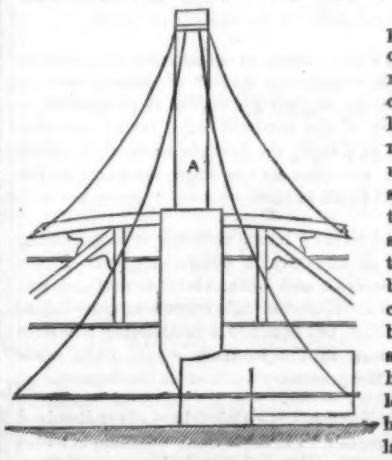
1st. The part of the area of the head covered by the area of cross section of the flues, or tubes, would have to be deducted in determining the sum of the pressure of the steam against the heads acting to pull the boiler apart transversely; and,

2d. The strength of the tubes, or flues, should be added to the strength of the shell, as if they were stays between the heads, increasing the ability of the boiler to resist rupture transversely.

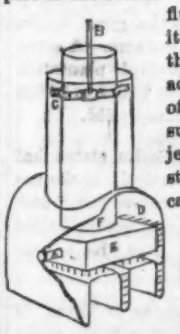


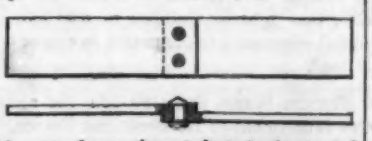
Yet, notwithstanding these important considerations, I do not think there has ever been a single example noticed of the longitudinal rupture of an upright boiler. The cut represents a boiler which exploded disastrously on Stone street, New York; the rupture was transverse, and therefore was not caused by the pressure of the steam. It was established by the evidence before a coroner's jury that this boiler carried but fifty pounds of steam at the instant of the explosion, yet a calculation based upon the actual strength of the iron, determined by actual experiment that a force equal to sixteen hundred pounds to the inch, upon the whole area of the head, would be necessary to break it in the manner it was ruptured; that is, transversely through the intact sheet, about twelve inches above a transverse seam.

If the force with which the tubes would expand, if made hotter than the shell, should be considered, or the increased circumference of that part of the shell above the water from the same cause, should be taken into account, in addition to the pressure of the steam, the explosion may be accounted for.

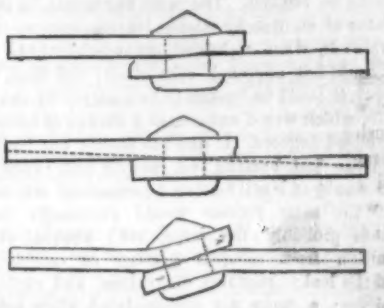


No class of explosion is more common than the rupture of steam chimneys on the kind of boilers almost universally used on river and sound boats along the Atlantic coast, such as shown in the cut. I do not believe a single case can be remembered in which a steam chimney has been ruptured longitudinally. I have known of a large number which have burst transversely, and leaks in the transverse seams are so common that scarcely one can be found which does not leak. It is not the pressure of the steam which is the cause of either the leaks, rupture, or explosion, in this part of the boiler. But if the force with which the uptake flue (F), on the cut, expands upward when it is heated to a higher temperature than the outside shell, is taken into account, in addition to, or even without the pressure of the steam, it can be understood why such parts of a boiler give way when subject to only twenty-five pounds pressure of steam, after the water test has shown them capable of withstanding fifty pounds.





It has been found by actual experiment that single riveted seams have but fifty-seven hundreds of the strength of the iron elsewhere than through the rivet holes. The ratio of weakness is greater than the proportion of the iron, cut out in punching the holes. This is probably due in part to the distortion of the iron by the punch, immediately about the hole, putting the material in a state of tension, or strain. The caulking tool also buckles the iron,

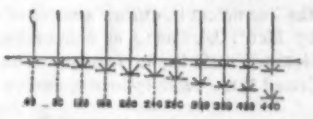


and thereby adds to the tension; and the lap of the sheet throws it out of the line of the tension exerted by the pressure of the steam, the tendency being to bend the sheet as shown in the cut.

As all structuers are only as strong as their weakest part, it would seem to be a reprehensible error in boilermakers to continue to construct boilers with invariable lines of weakness, like the seams, having but little more than half the strength of other parts. But it has been almost invariably noticed, when examples of exploded boilers were being examined, that the rupture did not either begin with, or follow the rivet holes, or any weak part of the iron with flaws, which is also an indication that some other force than the elastic pressure of the steam caused the initiatory rupture.

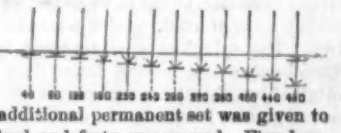
Any piece of iron subjected to a tensile strain will be stretched to the extent which will give it a permanent set by about one half the force which will break it. This curious fact was discovered and demonstrated by Professor Daniel Treadwell, whose essays on some of the qualities of metals are extremely valuable.

The experiment was constructed by stretching a piece of wire along a table, about fourteen feet in length,

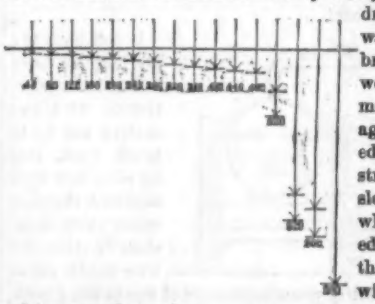


and by means of a lever, after marking its length, subjecting it to a tension of forty pounds. The extension for that weight, and for each weight applied is shown full size on the cut. The weight was removed after each application, and it was found that two hundred and eighty pounds gave the first permanent set; that is, the iron did not recover its original length after the application of that weight. The continued additions to the weights shown, increased the permanent extension until four hundred and forty pounds were sustained, without breaking the iron, which will be noticed, is nearly double the weight which gave the first permanent stretching of the wire.

Another series of the application of the successive weights from forty pounds upwards, was then began, with



the same iron; but no additional permanent set was given to the wire until four hundred and forty was passed. Five hundred and twenty was reached without breaking, which weight being removed, and applied again, was suspended for several hours, stretching the wire slowly, as shown, when it was removed; and afterwards the wire was broken with five hundred and ten pounds tension.

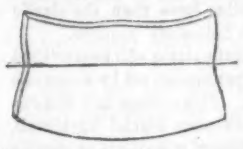


From this we may conclude that if we find a part of a boiler which has burst, of an equal strength with the ruptured part, not stretched or distorted, that it was not the pressure of the steam which caused the initiatory rupture.

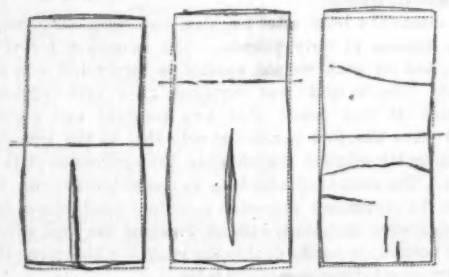
If the pressure of the steam were the only force to be restrained in boilers, it would be easy for the boilermaker, or engineer, to provide boilers which could not possibly be burst. For instance, if a boiler of certain dimensions, made of quarter-inch iron, should burst, make the next one to take its place of iron half an inch thick. Or why not four inches thick? If iron with a tensile strength of 50,000 lbs. to the inch is ruptured, why not take high steel, with a tensile strength of 120,000 lbs. to the square inch? These seem to be natural questions to ask, but they are answered by the statement that it is not the strongest boiler which is found to stand the best, but the boiler which is made of the softest and most ductile materials. A boiler might be made of iron so thick that it would not conduct heat enough through to the water to generate steam at all, while the iron would be entirely destroyed by unequal expansion, from the difference of temperature between the surface of the plates exposed to the fire, and the one exposed to the water. And although a boiler made of high steel would withstand a much higher cold water test than an iron boiler of the same thickness, it could not withstand unequal heating so well, on account of its greater density; and, consequently, the greater force with which it would expand and contract, as it was heated or cooled unequally. Metals expand, as they are heated, with a force which exactly equals the force with which they would resist compression at the same temperature

and contract with a force which exactly equals the force with which extension to the same extent would be resisted.

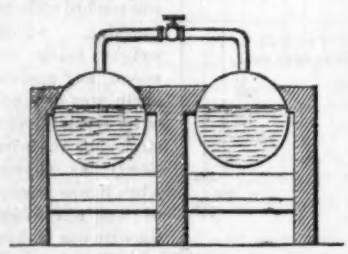
A bar of railroad iron may have eight inches area of cross section, and a tensile strength of 20,000 to the square inch. Such a bar would be pulled apart if it were extended three eighths of an inch lengthwise, and the force necessary to extend it would be 160,000. The same bar would be extended three eighths of an inch by raising its temperature one hundred degrees: If, when so heated, its ends should be so fixed that they could not approach each other; and then, the bar being cooled, it could be broken in two simply by the force of contraction, which would come from a change of temperature of one hundred degrees. If the bar should not be actually broken by the first heating and cooling under such circumstances, it would at least receive a permanent set, and repetitions of the same process would eventually break it. And this is probably the force, viz: unequal expansion or contraction from unequal heating or cooling, which causes all the leaks, ruptures, distortions, and explosions of steam boilers; a force not contemplated when boilers are subjected to the test of cold water pressure by the steam boat inspectors; a force which does not effect the steam gage or safety valve, and therefore these instruments do not indicate it. When we come to examine the ruptured, leaky, or the exploded boiler, we have no means of determining the extent of the force which caused the accident, and the engineer has no means of either determining or preventing it. The boilermaker cannot make a boiler to withstand it, for the stronger the boiler the greater the force. The only practical way to avoid the danger is to equalize the temperature in all parts of the boiler, at all times and under all circumstances, which happily it is easy to do.



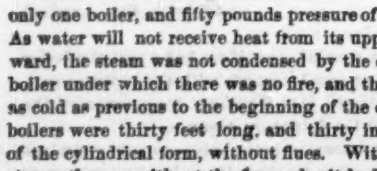
This cut shows the distortions of a piece of boiler iron twelve inches long, eight inches wide, and half an inch thick, which was heated twenty times, red hot, and then dipped edgewise in water, so as to immerse it a little more than half its width, as shown by the line across it, during a series of experiments conducted by Lieut. Col. Clerke, as communicated by him to one of the learned societies in London. The same gentleman also subjected three solid cylinders, twelve inches long, and four

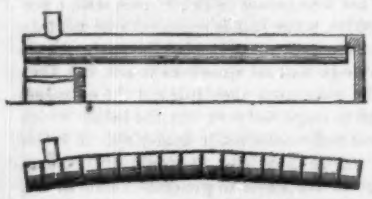


inches diameter, to the same ordeal of heating and partial cooling; one of steel, one of wrought iron, and one of cast iron. The cylinders were ruptured in the manner shown. Each became longer—the dotted lines on the cuts show the original length—the central part of the metal being squeezed out to greater length by the contraction of the outside, which cooled first, and contracted upon the interior metal, like the tire upon a wagon wheel.



It was once my privilege to have a chance to experiment with two boilers set up in brick work, side by side, but with separate furnaces under each. Occasionally the fire was made under only one boiler, and fifty pounds pressure of steam filled both. As water will not receive heat from its upper surface downward, the steam was not condensed by the cold water in the boiler under which there was no fire, and the water remained as cold as previous to the beginning of the experiment. The boilers were thirty feet long, and thirty inches in diameter, of the cylindrical form, without flues. With fifty pounds of steam, the one without the fire under it had a temperature of 301° Fah., in the water, and in the steam; and at that temperature was about one and a half inches longer than when cold. The other, having water at a temperature of 60° in the bottom, and steam at a temperature of 301° in the top, was bent into the form of a segment of a circle, and was caused to leak badly along the bottom. I concluded the strain upon the boiler was quite as great as if it had been bolted down at the ends and jackscrews adjusted under it along the middle of its length, and "worked up" until the boiler was bent to the same extent. It was considered extremely dangerous to carry fifty pounds of steam in a boiler under such circumstances, and the experiment was not repeated. Yet engineers frequently have a high pressure of steam on boilers while subjected to equal strains of unequal expansion, without knowing it. Boilers explode under such circumstances, and everybody wonders. Enormous pressures are attributed to steam accumulated suddenly in some mysterious manner, and the error is repeated again and again. NORMAN WIARD.





"THE WHEEL."

Price 25 cts. May be obtained through the news agencies, or by mail. Address Munn & Co., Scientific American office, 37 Park Row, New York.

Editorial Summary.

ELASTIC AND SWEET GLUE, which does not spoil, is obtained as follows:—Good common glue is dissolved in water, on the water bath, and the water evaporated down to a mass of thick consistence, to which a quantity of glycerin, equal in weight with the glue, is added, after which the heating is continued until all the water has been driven off, when the mass is poured out into molds, or on a marble slab. This mixture answers for stamps, printers' rolls, galvano-plastic copies, etc. The Sweet Glue, for ready use by moistening with the tongue, is made in the same way, substituting, however, the same quantity of powdered sugar for the glycerin.—*Druggists' Circular.*

PHOTOGRAPHING THE INTERIOR OF A TUNNEL. Mr. Evans has presented to the New York Institute of Engineers, a photograph of the high level tunnel of the Central Pacific railroad. The east end of the tunnel being sometimes illuminated at sunrise, a large mirror was employed to reflect the sun's rays equally over the whole of the interior, while the picture was being photographed. The plate having been exposed about fifteen minutes, a print was taken showing every detail, even to the timbering of the drifted headings, with great distinctness and accuracy.

BEFORE washing almost any colored fabrics, it is recommended to soak them for some time in water, to every gallon of which is added a spoonful of ox-gall. A tea-cup of lye in a pail of water is said to improve the color of black goods, when it is necessary to wash them. A strong, clean tea of common hay will preserve the color of French linens. Vinegar in the rinsing water for pink or green, will brighten those colors, and soda answers the same end for both purple and blue.

SWEDISH AGRICULTURAL FAIR. We are in the receipt of the announcement that the Twelfth General Agricultural meeting of Sweden, will open on the fourth day of next August. Two invitations, the one in the French language the other in English, have been sent, urging us to participate in the exhibition. These we generously extend to any of our readers who may desire them. Mr. C. Jahlin Dannfelt is the Secretary, and communications may be addressed to him, at Stockholm, Sweden.

ARTIFICIAL GRINDSTONES.—Few of our quarried stones are of even texture. Sometimes there appears to be a spicula of flint, like a steel spike, extending from the circumference to the center, which will not yield to the razing iron. It is said that the Ransome artificial grindstone is free from this serious defect, and that notwithstanding its greater cost it is really cheaper than the quarried stone. If this is so, this stone, coming rapidly into favor as a building material, will be found to be no less valuable for mechanical purposes.

A PHILOLOGICAL FACT.—Becanus accounts for the presence of the word "sack," variously spelled of course, in very many languages, by the explanation that at the dispersion of mankind at the foot of the tower of Babel, every one took away his valuables in a sack, the most indispensable article on a long journey, and that no one forgot the name of the thing which was all in all to him.

A French medical expert lately testified in a poisoning case, that he had no difficulty in detecting poison in the stomach of the deceased, and acknowledged that he had observed symptoms attributed to this cause sometime before the death of the victim, but declined administering antidotes because their presence in the stomach would have made trouble in proving the presence of poison at the inquest.

A NEW TEST FOR FREE ACIDS.—Chloride of silver dissolved in just sufficient ammonia to make a clear solution, is stated by a correspondent of the *Chemical News* to be a very delicate test for a free acid. If a little of the test is added to ordinary spring water, the carbonic acid present in the latter will neutralize the ammonia and precipitate the chloride.

PEANUTS in North Carolina, where they are chiefly raised, have almost taken the place of cotton as the great staple, and bring their cultivators annually $100 per acre. A correspondent informs us that 8,000 bushels on a single plantation is considered but an average crop, while from 10,000 to 16,000 bushels is not regarded as a very extraordinary yield.

LEADEN TOBACCO BOXES. Dr. Mayer, of Berlin, states that he has traced six cases of lead colic and paralysis to the use of tobacco held in leaden boxes. M. Chevallier has found, also, that tobacco wrapped in lead foil,—improperly called tinfoil,—becomes impregnated in course of time with acetate of lead.

FRENCH FOSSIL REMAINS.—In the commune of Tayac, in the department of La Dordogne, France, seven fossil skeletons have been discovered, the utensils and arms surrounding which indicate the remote period of the age of stone, before the use of metals was discovered.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

SIDE RUDDER FOR SHIPS.—Wm. H. Conway, Harrison, Md.—This device is designed to assist a vessel in turning, and is particularly useful in backing out steamboats from their landings, enabling them to be turned in a much shorter space than when rudders at the end only are used.

VAPOR BURNER.—S. B. Hopkins and E. H. Anderson, Easton, Md.—This invention is an improvement upon the vapor burner patented by us April 3 1860, and consists in using four holes instead of the two holes and slit of the former burner, and a transverse concave plate in addition to the concave plate shown in the former invention.

SHOEMAKER'S BENCH.—J. A. Mahn and Chas. Vogler, Degraff, Ohio.—The object of this invention is to provide a neat and convenient bench for the use of shoemakers, which shall have, on one side of the operator, an adjustable clamp, of improved construction, and on the other side, an adjustable rotating jack for holding boots and shoes during the operation of pegging.

WINDMILL.—John A. Wheeler, Freeborn, Minn.—This invention relates to a new manner of hanging sectional sails in the frame of a windmill, and consists chiefly in the use of additional arms, which, in connection with the radial arms projecting from the shaft, serve as supports for the sectional sails, so that the same can be pivoted at right angles to the radial arms, whereby the adjusting of the sails is greatly facilitated.

STOVE.—Edwin A. Parker, Horseheads, N. Y.—This invention relates to a novel manner of constructing the base of a stove or furnace, with a view of conducting a supply of fresh, warmed air to the fire, to aid combustion, and of conducting another supply of fresh, warmed air into the room, so that the air in the room will not only not be vitiated by the stove, but will actually be improved and purified by the constant stream of fresh air entering the room, a suitable ventilator being required to carry off the surplus air.

MARINE GRAPPLE.—Joseph T. Martin, New York city.—This invention consists in arranging the claws or hooks on a single bar or beam, which is perforated or slotted so that the claws can be adjusted on it to adapt them to vessels of suitable breadth. By thus doing away with the extension beam that was formerly used, the apparatus is not only made considerably cheaper but also much stronger.

TRAVELING BAG.—Jacob Lagowitz, Newark, N. J.—This invention relates to a new manner of preventing the ends of traveling bags from getting loose, and consists in attaching to each of the links by which the ends of the handle are connected with the bag, two arms, which, when the bag is suspended from the handle, fit over and around the sides of the bag, holding the same together and relieving the lock.

PROCESS FOR CONVERTING CAST IRON INTO CAST STEEL AND MALLEABLE IRON.—Francis Ellershausan, Montreal, Canada East.—This invention relates to a new process for converting cast iron into malleable iron or cast steel, and consists in bringing the carbon contained in the molten cast or pig iron in contact with oxygen contained on the surface of a cold or hot solid substance or substances. The distinguishing feature between this invention and that known as the Bessemer process is, that in the latter the carbon contained in the molten cast or pig iron is brought in contact with and consumed by the oxygen held in vaporous form, while in this process the oxygen is held on the surfaces of substances or solid bodies.

TAPPING AND DRILLING MACHINE.—George Cahill, New York city.—The object of this invention is to facilitate the setting of the turnover tap-stock of a machine for tapping or drilling pipe fittings, without requiring the shaft on which the device turns to be stopped for such setting of the tap stock.

DITCHING MACHINE.—F. M. Howard and D. W. Avery, St. Paul, Ind.—This invention relates to a new and improved method of constructing machines for ditching and for excavating dirt, whereby the same are more simple in construction, more effective in operation, not liable to get clogged or out of repair, and which can easily be adjusted for the plow to run at any desired depth.

PLANE.—D. E. and A. A. Aiken, Adrian, Mich.—The present invention relates to an improved plane or machine for the cutting of slats, to be used more particularly in making curtains, and the invention consists in making the throat of the cutter in the wedge, and also in the use of a spring within the throat, so constructed as to cause one slat to push another out, whereby the throat and bit are left free and all danger of the throat becoming clogged rendered impossible. This spring also acts to press the slat uniformly and closely up against the bit, thus leaving the slat smooth and straight and is arranged so as to be susceptible of adjustment for thick or thin slats.

WAGON BRAKE.—Claude Ducreux, New York city.—This invention consists in securing adjustable rings around the hubs of the rear wheels, said rings having lugs projecting from their peripheries, and having an oscillating bar hinged parallel to the rear axle, with projecting lugs at its ends, so that when the bar is turned by the forward motion of the brake rod pivoted to a crank on the bar, the lugs will strike against the lugs on the ring, and will thereby prevent the wheels from turning, thus stopping the carriage.

SUSPENDING RING FOR BUSINESS CARDS.—H. S. Griffiths, Brooklyn, N. Y.—This invention relates to a new and useful device for attaching to business cards, by which they may be conveniently suspended against a wall for display and preservation.

REVERSIBLE BOOT HEEL.—Frederick Richardson, New Bedford, Mass.—This invention consists in forming the heel so that its center or wearing portion may be reversed.

COMBINED MOP AND SCRUB BRUSH.—William S. Simpson, Berea, Ohio.—This invention consists in combining with the scrub brush, rollers, between which a mop, or absorbing cloth is confined and operated,

CORN HARVESTER.—Peter C. Yost, Hamilton, Ill.—This invention relates to an improved machine for cutting and gathering the stalks of Indian corn and consists of a knife of peculiar construction, mounted on a crossbeam on a sled, the corn being fed to the knife between two hooks one of which serves to catch the corn and the other prevents it from lodging in front of the beam and guides it to the knife.

MACHINE FOR SAWING LATHS AND OTHER SIMILAR LIGHT STUFF.—I. A. Hedges, Cincinnati, Ohio.—This invention relates to a new and improved improved machine for sawing laths and other similar light stuff and consists in a novel construction of the machine, arrangement of its parts, etc., as hereinafter fully shown and described, whereby several advantages are obtained, to wit: compactness, rapidity of work, simplicity in the construction of the machine and the little labor required in attending it while in operation.

GRAIN BINDER.—Marcus M. Wells, Hartwick, N. Y.—This invention relates to a new device for gathering the grain behind a mowing machine or cradle, and for arranging the same so that it can be easily bound into bundles of the required size. The invention consists in the use of a C-shaped rake frame, which is composed of iron or other bars, connected by means of suitable cross-bars, and moved by hand or otherwise through the swath, so that the points of the bars will rest on the ground and will rake up all the grain under which they pass so that the required quantity of the grain will be deposited upon the frame.

SPUR WHEEL.—C. F. Woodruff, Newbern, Tenn.—This invention relates to improvements in wooden spur wheels, and consists in constructing the rim in sectional segments cut in the plane of the wheel centrally and having the ends of the segments lap so as to break joints, which sectional segments are held together by means of double dove-tail tenons or shanks on the cogs fitting in corresponding mortises in the two sections; and also in uniting the arms of the wheel to the rim by passing their ends between the ends or shank ends of two contiguous cogs forming a dove-tail connection that is secured by bolts.

CHURN.—A. L. Converse, Springfield, Ill.—This invention has for its object to furnish an improved churn so constructed and arranged as to throw the cream into a very violent agitation bringing the butter quickly and thoroughly, and with a comparatively small outlay of power.

DOUBLE SHOVEL CULTIVATOR.—Simeon B. Forbes, New Cumberland West Va.—This invention has for its object to furnish an improved double shovel cultivator, simple in construction, effective in operation, and easily operated.

ROTARY SCRUBBING BRUSH AND SPRINKLER.—Charles E. Wareham, Port Washington, Wis.—The object of this invention is to provide housekeepers with a convenient article for scrubbing and cleaning floors or for use on board of ships to scrub the deck, or any similar purpose.

EXTENSION PIPE COUPLING.—James McCarthy, New York city.—This invention relates to a new pipe coupling, which is so arranged that the ends of pipes that are a greater or less distance apart from each other can be connected by the same; its object is to take the strain from pipes and to make up small spaces which may be left between the ends of the pipes.

WHIP.—James R. Gillett, Westfield, Mass.—This invention relates to a new manner of protecting the cone of whips from moisture and from consequent injury, and consists in the application, around the core and between the same and the outer covering, of a metallic lining, whereby the moisture will be completely excluded from the core, and whereby the whip will consequently be made sound and strong.

DOOR DIRECTORY.—Lewis Burger, Springfield, Ill.—This invention relates to a new indicator or directory to be attached to office or other doors. Its object is to indicate to parties intending to enter the office whether the proprietor is in or not, and if not, when he will return, and whither he has gone. The indicator may be connected with a letter box, card holder, and with a slate, for orders.

LAMP BURNER.—Charles M. Miles and George W. Remsen, Lincoln, Del.—This invention relates to a new burner for petroleum and other lamps and consists, first, in the arrangement of a turret between the cap and the ordinary body of the burner, said turret having holes that can be closed by a suitable sliding gate, and through which a match may be applied to the wick for the purpose of lighting the lamp without removing the chimney.

STEAM ENGINE.—J. P. Davis, Stiles, Wis.—This invention relates to certain devices for the purpose of converting rectilinear into rotary motion without employing a crank upon the main shaft.

AUTOMATIC WATER SUPPLY REGULATOR FOR WATER CLOSETS.—George Conron, New York city.—This invention is designed as an attachment for a water closet apparatus, previously invented by me, and for which an application for a patent is now pending in the United States Patent Office. The invention consists of a float ball or vessel within a center chamber which communicates with the discharge pipe of the water closet bowl, the float ball being connected with the supply pipe valve by means of a lever and so arranged that when the water from the bowl is drawn off by lifting its proper valve, the water in the chamber will, in subsiding, lower the float ball and bring its weight upon the lever connecting it with the supply valve, and thereby relieve the latter free to raise and admit a quantity of water for cleaning the bowl and its connections.

VELOCIPEDE.—O. T. Gleason, Farmington, Me.—The object of this invention is to obtain locomotion by the direct application of the weight of the operator to the crank of the driving shaft.

KING BOLT FOR CARRIAGES.—John Reiber and John Shadrer, Bridgeport, Ill.—The object of this invention is to provide a jointed king bolt for coupling the front and rear axles of carriages, whereby the front axle is permitted to vibrate l aterally when the wheels strike any obstacle or obstruction or pass over any uneven portion of ground.

GRAIN MEASURING REGISTER.—Wm. H. Pfrimmer, Lanesville, Ind.—The object of this invention is to keep an accurate record of the quantity of grain measured or weighed by means of a self-registering apparatus, whereby disputes which often occur in the delivery of grain between farmers and dealers are prevented or avoided. This improvement consists in a device connected with a weighing scale for marking the number of bushels or other quantity weighed on a dial plate which keeps the register every time a certain quantity is weighed or measured.

DOUBLE STEAM VALVE.—Albert Moore and A. D. Howes, South Adams, Mass.—The object of this invention is to furnish a valve for steam, water, and gas, or other fluids or liquids, constructed in such a manner that it shall be durable and simple, and perfect in its operation, and it consists in operating two valves by revolving a screw stem, and in the general construction and arrangement of parts.

WEAVING GARMENTS.—Samuel Leather, Dalton, England.—This invention relates to an improvement in weaving garments or wearing apparel, such as shirts, pantaloons, drawers, etc., etc., by stitching double cloth together with seams between the articles, in such a manner that a series of the same garments are woven and stitched at the same time, to be afterwards cut apart between the seams, thus effecting great economy in the making of such garments, and a great saving of material now wasted by cutting.

SEED PLANTER AND CULTIVATOR.—Caspar Rubbles, Lowville, N. Y.—This invention relates to a new and improved combination of a seed planter and cultivator, whereby the machine may be used either as a seed planter or cultivator, and made to work in either capacity equally as well as if made separately for each.

COAL HOPPER AND SCALE.—Frank E. Howe, New York city, and Lindsey I. Howe, Boston, Mass.—This invention consists in combining a coal hopper with a scale in such a manner that coal may be dumped directly from the cart which delivers the coal into the hopper of the scale and weighed, and then discharged into the hole. The object of the invention is to obtain, by a very simple attachment to an ordinary platform scale, a means whereby consumers of coal may weigh the same as it is delivered to them, and thereby prevent the fraud of light or short weight, which is now almost universally practiced by retail coal dealers.

RECIPROCATING SAWS.—Solomon Anderson, West Burlington, N. Y.—This invention relates to a new and useful improvement in reciprocating saws, and it consists in a peculiar construction of the teeth of the same, whereby the teeth are made to cut the wood after the manner of chisels, instead of scraping the same and tearing away the fiber, as is the case with the teeth of ordinary construction, which render the sawed lumber very rough, and require a great expenditure of power in sawing.

STONING CHERRIES.—Rufus Wright, Brooklyn, N. Y.—This invention relates to a new and improved machine for removing the stones from cherries, and consists in the employment or use of an intermittingly rotating feed wheel, and in means for operating the same, and also in certain means for ensuring the feeding of but one cherry at a time to the stone-ejecting apparatus.

CLOTH WATERPROOF BASKET.—Sarah P. P. Miller, Beaver, Pa.—This invention relates to a new and useful improvement in the material used and in the method of forming or manufacturing baskets for various purposes.

RAILROAD CARS.—J. R. Perry and D. W. Perry, Wilkesbarre, Pa.—This invention consists principally in providing an axle for each wheel, and arranging it so that the wheels of the car can revolve independently of each other, and thereby adjust themselves to the curves of the track.

POLISHING MACHINE.—John Stackhouse, West Pittsburgh, Pa.—This invention relates to a new and improved machine for polishing steel rolls, and rolls or rods of other metals.

MACHINE FOR SAWING BOLTS.—T. Bruno, Saginaw, Mich.—This invention relates to a new and improved method of constructing machinery for sawing bolts, or laths, or other strips, from planks or boards, whereby time and labor are economized.

APPLICATION OF SHADES TO WINDOWS.—J. D. Legg, Long Eddy, N. Y.—This invention relates to a new and improved mode of applying shades to windows, whereby the former may be raised and lowered either from the top or bottom, as occasion may require. Its object is to obtain a very simple means for accomplishing the above result, which will not be liable to get out of repair.

DRAFT ATTACHMENT FOR VEHICLES.—Moses Adsit, Forrest, N. Y.—This invention relates to a new and useful improvement in draft attachments for all kinds of vehicles which are drawn by horses, and has for its object the equalizing of the draft by admitting of the whiffletrees being automatically adjusted in relation with the double tree under the pull of the team, and in such a manner that if one horse of a team has an inclination to pull more than his share his labor will be perpetually increased, while the other horse will have his labors correspondingly decreased, and will feel encouraged to exert himself and pull up even with the more ambitious one. By this means the device will not only have a tendency to correct a team which pulls unevenly for the time being, but will also have a tendency to break or train an unmatched team, so that the two horses of the same, will, in a short time, be permanently matched, so far as equal draft is concerned.

INSTRUMENT FOR TREATING HEMORRHOIDS.—H. Schevenell and S. S. Rembert, Memphis, Tenn.—The nature of this invention relates to the treatment of the inflammation of the anus or rectum, commonly known as hemorrhoids or piles. Its construction consists in the employment of a galvanic pole, or electrode, composed of a combination of different metals which are most productive of galvanic action. The galvanic action produced by the contact of the metals and the moisture of the parts with which they are in contact, conduces to reduce the tumid and inflamed state of the parts.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

H. C. F., of Ill.—The water color paints are simply made from the different powdered paints in the trade, ground exceedingly fine, and mixed with a solution of gum arabic. There are two kinds; the transparent paints, mostly used for finer work, as portraits, landscapes, etc., and the opaque paints, mostly used for painting coarser work, as stage scenery, etc. These are mixed with glue water without the addition of some gum or glue. All these paints, when dry, would rub off like chalk marks.

A. J. G., of Conn.—The cause of the appearance of solidity so strikingly exhibited by the stereoscope, is to a certain degree shown by a single photograph seen with only one eye, and it is the incomparable correctness of light and shadow in photographs by which we chiefly judge about solidity in single objects, and which is seen even better by examining a photograph with a magnifying glass or microscope. Do not paintings of great artists also exhibit the effect of solidity when seen with one eye?

M. B., of N. Y.—The condensed vapor rising from a black fluid is colorless when the black coloring matter is not volatile at the temperature at which the distillation takes place, if this coloring matter volatilizes at the temperature at the heat applied, the distillate will be black too. Chemists often find that the distillation at first gives a colorless fluid, later a darker, finally a black one. In many instances repeated distillations are required for perfect clarification.

A. G., of N.—When daguerreotypes or ferrotypes show occasionally some single object in its natural color, it is purely accidental. It is very common to see a bluish color in the sky, a gray color in the picture of a gray building, or a hazel color in hazel eyes. The different tones of shadow in photography are often not a neutral gray, but modulate into faint blue, brown and even purple, which tones of color sometimes accidentally correspond with that of the natural object.

C. L. M., of Ohio.—A good silver solution for electro plating white metal and brass is made by dissolving one part of oxide of silver in eight parts of cyanide of potassium and sixty-four parts of warm water. Oxide of silver is made by precipitating a solution of the nitrate by a dissolved alkali like potassa or baryta.

J. J. O. R., of Pa.—The report of M. Balramo's new battery given page 195, we simply extracted from an English scientific journal. We did not try it and therefore cannot guarrantee its asserted virtues; its action appears to be the formation of chloride of iron and sulphate of lime by the mutual decomposition of the liquids employed. We cannot judge of the cause of your failure without seeing your arrangement and testing practically what prevents the action.

J. B. W., of W.—The animalculae theory as cause of the cholera morbus is exploded long ago; the acid theory from fermenting food you appear to defend is only sufficient to explain the common, not malignant cholera; the genuine Asiatic cholera morbus is probably propagated by a vegetable microscopic organism, the existence of which has been practically proved. It is of the crystogamic family, belonging to the kind called *leptothrix*. It is, with help of the microscope, always and exclusively found in the discharge of patients suffering from the malignant Asiatic cholera. Dr. Klob, in Vienna, has lately investigated this subject thoroughly: he calls the plants *Quoglaa termo*. The presence of these discharges poisons the whole neighborhood, the ground and even the water in the wells and springs, which appear in some cases to have become contaminated with the invisible seeds of these parasitical plants.

W. D., of Oregon.—Gelatin molds are made for plaster castings when the details are of such a shape that it would be impossible to get the casting out of the mold when the last was not elastic. To make them, soak glue in a equal quantity of cold water (by weight), a little more or less, according to the quantity of your glue, which has to be found out by trial. The glue will after eight or ten hours be swelled and have absorbed all the water; then melt the mass by a moderate heat and cast your mold. Put it in a cool place for at least 12 hours before attempting to take it out. With such molds, when carefully oiled before each casting, 30 or 40 castings can be taken; or Canada balsam, a solution of india-rubber in benzole, may be added to the glue during the melting and incorporated by stirring; this will cause the mold to withstand the action of water better. Some glycerin added will prevent it from drying out so soon as it will when made out of simple glue. Some persons add also molasses to it, and make then a material very similar to the common printer's roller.

B. M. K., of Ind.—The solvents for india-rubber and gutta-percha are, to commence with the best, its own oil, obtained by distilling, and in which it is dissolved when freshly collected; next chloroform, then benzole or coal tar and turpentine; next bisulphide of carbon, in which it swells up and finally dissolves. Then benzine or petroleum, in which it slightly swells and only partially dissolves; in alcohol it is as insoluble as in water. In the manufacturing establishments of the present day little or no solvents are used; heat and mechanical powerful kneading with sulphur and chlorine for the vulcanizing are almost the only processes now in use; in former times the action of the principal solvents, turpentine and benzole (from coal tar, not benzine from petroleum), were aided by cutting, kneading, and heat, which is necessary to accomplish a good solution, but are abandoned now except in the manufacture of india-rubber varnishes, among which those made with turpentine have the not desirable property of always remaining sticky. Gutta-percha and india-rubber are now very common here. They may be bought by the yard in all our New York rubber stores in any desirable degrees of thickness, from that of paper to sole leather and even one or two inches thick.

P. V., of Iowa.—Aniline colors are made from benzole obtained from coal tar, not to be confounded with benzine distilled from petroleum. The desired recipe how to make them is too circumstantial to be inserted here; our correspondent's desire will be satisfied soon by an article on this subject to complete what was said on page 346.

L. J., of Mass.—After the law of Mariotte (which is not absolutely correct but enough so for all practical purposes), the volume of gases decreases in the same ratio that the pressure increases; therefore we will bring any volume of air to one tenth of its original bulk, when increasing the pressure it undergoes ten times. As now common air is normally under an atmospheric pressure of about 15 lbs. to the square inch we will reduce 25 cubic feet of air to one tenth or 2½ feet, when applying a pressure of 150 lbs. which is 10 x 15 or ten times the normal atmospheric pressure. The air chamber of your pump will therefore contain nine tenths of water and only one tenth of air, and probably even much less, as under such pressure the water absorbs the air very easily. Cases are not uncommon where the air was found to have entirely disappeared from the air chamber, which was totally filled with water, causing the pump to work unequally and with jars, in strong contrast with its smooth operation when the pressure is equalized by the highly elastic cushion formed by the contents of an air chamber entirely filled with air.

J. N., of C.—There is at present no easy nor cheap way to manufacture blocks of ice as large as you describe. All the machines made thus far are very expensive, and even at that cannot make such thick pieces. The cheapest method requiring the least first outlay for machine is perhaps that patented by Dr. Vander Weyde, of this city, and now being introduced in the Southern States. He uses a liquid he calls chimogene, but which really is nothing but petroleum gas condensed by a pressure of some six to ten atmospheres, the evaporation of which produces a cold of some 40° below the freezing point. But even the smallest of these machines require several hundred dollars first outlay. Small pieces of ice of some 10 lb. weight are easily made by freezing mixtures, or by a good air pump and a stream of sulphuric acid to absorb rapidly the rising aqueous vapors.

J. M., of S. C., asks what is meant by putting the "gags" on a low-pressure, American, marine, beam engine; also what is the best work published on the beam engine. "Gagging" means putting in operation a device attached to the Stevens' cut-off by which the point of steam cut off may be changed; so that if the engine is built and arranged for cutting off at any given point it may be made to cut off at any other point or to work full stroke the change being made while the engine is running. We cannot intelligibly explain the construction and operation of the contrivance without diagrams. The information you desire may be found in Bourne's "Catechism of the Steam Engine," Bourne's Hand Book of the Steam Engine," or "King's Notes on the Steam Engine."

H. M., of Ontario.—"Which is the more efficient feeder for the common high-pressure engine, a force pump with the feed water heated by the exhaust steam, or simply the Giffard injector? I have often observed that when steam is high and there is a full supply of water in the feed pump that by placing my hand on the boiler I felt it tremble and throb at every stroke of the feed pump. Is not the action of the feed pump similar to that of the hydraulic press, and if so is there not an enormous strain on the boiler?" The Giffard injector is a very convenient auxiliary, but it is an expensive mode of feeding a boiler aside from the fact that it does not work hot water. The trembling of pipes and boiler by the action of the force pump is always noticed. The force pump is a hydraulic press so far as it goes. We think, however, you are unnecessarily alarmed about its effect on your boiler, so long as you have the usual steam space in it.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Wanted—A second-hand caloric engine of small capacity. Address, stating size and price, Jno. Q. Everson, lock box 69, Pittsburgh, Pa.

For Sale—A 12-horse engine and boiler, complete. Been run 2 days only. Address H. P. J., Cheshire, Conn.

Manufacturers of blacking boxes please send address to J. T. Fenneman, cor. Lombard and Poppleton sts., Baltimore, Md.

Important to Somebody.—For sale, at decided bargains, one hand lathe, 9-foot bed, ratchet foot motion, leading screw, sets to taper, etc., etc., one Florence sewing machine ($75,) for $50. Address, for particulars, Jos. D. Brown, Edinboro, Erie county, Pa.

Parties desiring fine and light machinery, models, etc. Also, machinery for specific purposes, requiring superior workmanship, will call on or address Henry Feyh, care Bissell and Fay 510, West 34th st. Best Manufacturers' references.

Rare chance—the whole or a part of Brooks' improvement in carriage wheels, patented Oct. 15, '67, will be sold low if applied for soon. Send for circular. R. Brooks, Jr., Rockport, Mass.

Burr & Wise, of Gainesville, Hancock county, Miss., desire to communicate with parties who furnish machinery for making matches and round wooden boxes.

Funston's electric toy.—See advertisement.

The surest detective of low and high water, and high steam in boilers yet invented. Springer, Hess & Co., Philadelphia, Pa.

Merriman's patent bolt cutters—best in use. Address, for circulars, etc., H. B. Brown & Co., New Haven, Conn.

Bartlett's machine and needle depot, 569 Broadway, New York. Needles for all machines. Hackle, Gill Pins, etc.

Engineering facts and figures for 1867, mailed on receipt of $3. John Penington & Son, 127 S. 7th st., Philadelphia, Pa.

Mill-stone dressing diamond machine, simple, effective, and durable. Also, Glaziers' diamonds, and for all mechanical purposes. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

For Sale—Eight new portable steam engines, thirty horse-power each, of superior construction. Address Poole & Hunt, Baltimore.

First class lock makers wanted. Address Jones & Nimick Manufacturing Co., Pittsburgh, Pa.

Incrustations removed without injury or foaming, by Winans' boiler powder, (11 Wall st., N. Y.,) 12 years standard and reliable.

EXTENSION NOTICES.

Benjamin Bray, of Salem, Mass., having petitioned for the extension of a patent granted to him the 5th day of September, 1854, for an improvement in spring rollers for window curtains, etc., for seven years from the expiration of said patent, which takes place 5th day of September, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 17th day of August next.

Bradford S. and Charles M. Pierce, of New Bedford, Mass., having petitioned for the extension of a patent granted to them the 1st day of August, 1854, for an improvement in molds for cement, or earthen tubes, for seven years from the expiration of said patent, which takes place on the 1st day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 20th day of July next.

NEW PUBLICATIONS.

THE WORKSHOP. E. Steiger, 17 North William street, New York.

Has commenced the publication in numbers, 50 cents each, of a very interesting and useful work, adapted to all the higher ornamental arts and industries. The first three numbers are out, and each contains a large number of finely executed engravings of the most ornamental articles at the Paris Exposition, consisting of carved cornices, furniture, cutlery, carpets, designs, stucco ceilings, jewelry, porcelain ware, vases, chandeliers, ornamental iron work, etc. The work will be found advertised in another column.

PRACTICAL GUIDE FOR PUDDLING IRON AND STEEL. Edric Urbin. H. C. Baird & Co., 406 Walnut st., Philadelphia.

A pamphlet of 45 pages on the above subject, including a comparison of the resisting powers of iron and steel, by A. Birkl, comprising 80 pages more, and 32 pages of advertisements of scientific books published and sold by Baird, making a volume, including preface, index, and advertisements, of 160 pages. Price $1.

Improvement in Machines for Harvesting Corn.

The object of the implement shown in the engraving is to gather and husk standing corn, at the same time cutting down the stalks. The labor of harvesting corn by hand is onerous, and a machine that will do it properly must be a valuable implement for the farmer. That exhibited in the engraving is a strong frame mounted on two wheels, and supporting a seat for the driver, a platform for his assistant, and the appurtenances necessary to the working of the machine. The front of the platform of the machine is beveled, so as to pass easily between the rows of corn, and a spring beam, A, projects forward on one side of the platform, forming, with the inclined edge of the platform, a V-shaped opening for the reception of the stalks as the implement is driven along. By means of a gear wheel fastened to the shaft, motion is given to the machinery: the driving wheels turn loosely on the axle and give motion to it, when the machine is driven forward, by means of a rachet and pawl, the wheels turning free on the shaft when the machine is backed.

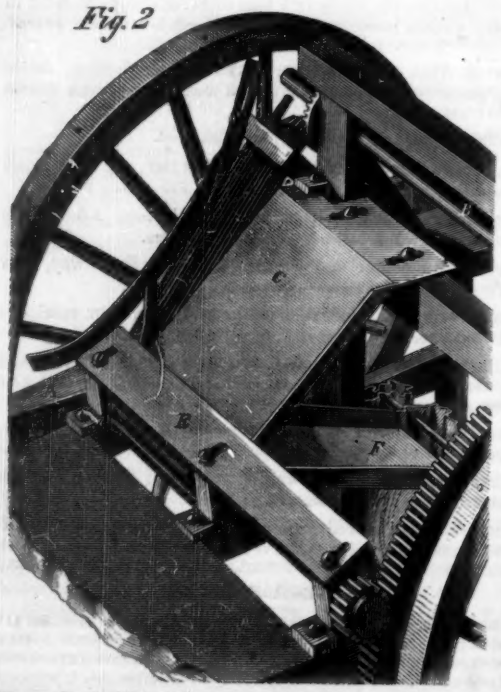
A horizontal counter shaft, B, receives motion from the large gear on the axle, and, by means of bevel gears, rotates two inclined fluted rollers, seen plainly in Fig. 2, the ends of which project down into the angular space between the spring beam, A, and the edge of the platform. These rollers are held together at their lower ends by the spring beam, and receive the stalks of corn, by their rotation cutting the ears from the stalks, and passing them on to the incline, C.

Fig. 1.

CHASE'S PATENT CORN HARVESTING MACHINE.

The ears are prevented from escaping after passing on to the rollers by two springs, seen in Fig. 2. The stalks pass between the rollers—having been severed near the ground by a triangular serrated knife, D, Fig. 1—and fall upon the ground.

Fig. 2



From the incline, C, the ears pass to a pair of horizontal rollers under the cap, E, by which they are husked, when they drop on the platform, F, Fig. 2, and are delivered into bags, or other suitable receptacles at the rear, the husks, as they leave the rollers, dropping to the ground, or, if desirable to save them, to any proper receptacle under the machine.

Patented by Otis N. Chase, who may be addressed relative to the machine at 81 Washington street, Boston, Mass.

Manufacture of Meat and other Biscuit.

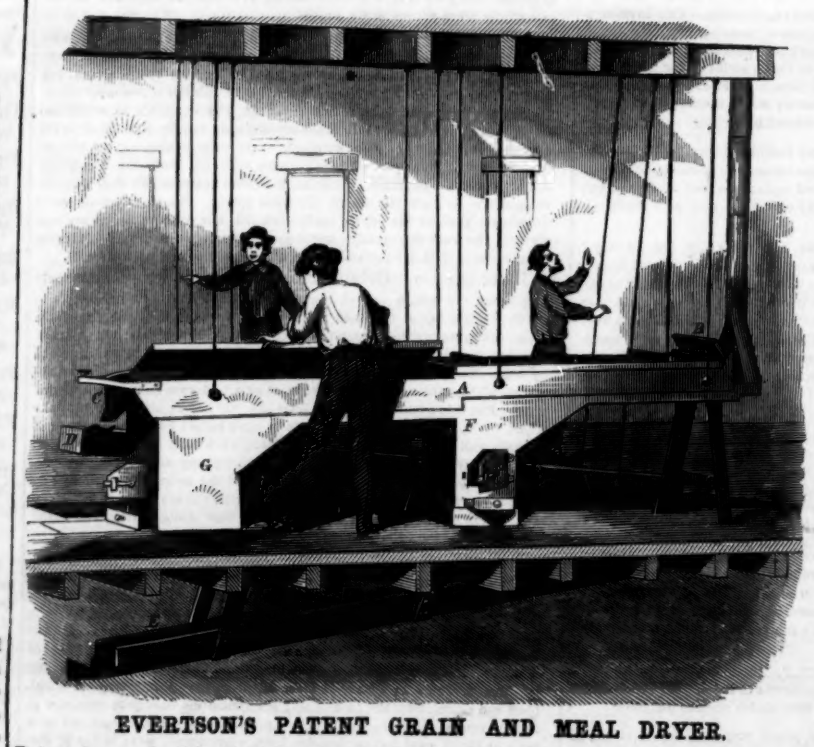
John Carr and Charles Lucop, of England, have obtained an American patent. "We make plain biscuit, and bake it as usual, then we grind it to powder, and we mix the extract of meat with the powder. Afterwards, we mold the powder, which is hardly moistened by the extract, into a biscuit by heavy pressure or by stamping it in a suitable mold. Although we prefer to mix the extract of meat with powdered biscuit, other materials, such, for example, as baked flour, may be substituted for the biscuit, but less advantageously. This method of making biscuits is also applicable advantageously when extract of meat is not employed, but where it is required to incorporate in the biscuits other materials which might be injured by the heat of the oven.

"We employ the same method when making biscuits with preserved fruits, the materials which require baking going into the ovens by themselves, and afterwards in a powdered state being mixed with the jam, or jelly, or other preserve, and formed into biscuits by pressure and without injurious heat.

"Cheese may be employed in a similar manner; and with cheese we operate in the following manner: We finely powder the biscuit, and also the cheese, but without mixing them. We place about half the biscuit powder required to make a biscuit into the mold; we then compress slightly in a small cylinder the requisite quantity of cheese, grated or otherwise, and afterwards place it on the powder in the biscuit mold. The remainder of the biscuit powder is put into the mold, and the pressure is applied, as before. In this way a biscuit is made with the cheese enclosed in the center."

Improvement in Device for Drying Grain.

This invention relates to a method of drying grain and meal by artificial means, and the device is simple in construction, and appears to be effective in operation. It is the subject of two patents obtained through the Scientific American Patent Agency, by John R. Evertson, and dated Nov. 29, 1866, and Oct. 15, 1867.



EVERTSON'S PATENT GRAIN AND MEAL DRYER.

The slide or pan, A, is suspended by rods from joists, or a frame overhead, the object being to allow of a vibrating or oscillating motion to the pan. The pan is on an incline, and the grain is fed into it at its upper end, B, from thence being carried down, by the inclination and motion of the pan, to the delivery spout, at C. Thence it passes into the inclined conductor, D, shown above the floor, and through a similar conductor, E, shown below, passing from its end into any receptacle provided for it. The object of this length of travel is to allow the grain or meal to become cooled after leaving the dryer.

The heat is artificial, being provided by the furnaces, F, the heated products of combustion in G passing under the pan to mingle with those in F, and thence passing under the rear portion of the pan, to be ultimately delivered to the smoke stack. It will be seen that the grain is first passed in at the point, B, nearest the chimney, where the heat is greatest, and that as the grain passes down to the delivery, at C, it is subjected to less and less heat.

The pan, A, has an offset at the furnace, F, the object of which is to turn and mix the grain, drying every portion alike. At these offsets the lids have apertures to permit the escape of the heated vapor developed by the process, thus aiding the process of drying.

It is evident that instead of two furnaces, or subdivisions of the dryer, three or more may be employed. Orders should be addressed to John R. Evertson, Mount Vernon, Ind.

Iron Stone.

At a point in the Thames, where an eddy accumulates a shoal of sand, agglutinating iron springs rise from beneath and progressively convert the sand into rock, which has to be removed, from time to time, by blasting. Bourne, the engineer, conceived from this circumstance the idea of turning quicksands to firm foundations by a similar process, and actually proposed to do this for the railway bridge over the Soane, in India. Quicksands, at this point, as deep as borings had been made, were to be converted into rock by injecting them, through perforated pipes, with sufficient iron water from a hill of iron pyrites near at hand, to stick together the whole mass. The line of the road was eventually altered, and the bridge was built at another point; but Mr. Bourne still believes that an expedient of this kind will become a valuable feature in engineering.

Quick Depilatory.

We recommend neither the dyeing or removing of hair, but if it must be done, it is best that the ingredients should be as little objectionable as possible.

Septimus Piesse makes the following statement in regard to a depilatory:—

As the ladies of this country consider the growth of hair upon the upper lip, upon the arms, and on the back of the neck to be detrimental to beauty, those who are troubled with such physical indications of good health and vital stamina have long had recourse to rusma or depilatory for removing it.

This and analagous preparations were introduced into this country from the East, rusma having been in use in the harems of Asia for many ages.

Best lime slacked, 3 lbs.; Orpiment, in powder, ½ lb.

Mix the material by means of a drum sieve; preserve the same for sale in well-corked or stoppered bottles.

Directions to be sold with the above:

Mix the depilatory powder with enough water to render it of a creamy consistence; lay it upon the hair for about five minutes, or until its caustic action upon the skin renders it necessary to be removed; a similar process to shaving is then to be gone through, but instead of using a razor, operate with an ivory or bone paper-knife then wash the part with plenty of water, and apply a little cold cream.

Dr. Redwood says that the best and safest depilatory consists of a strong solution of sulphuret of barium made into a paste with thick starch; it must be applied immediately it is made, as it rapidly spoils.

The precise time to leave depilatory upon the part to be depiliated cannot be given, because there is a physical difference in the nature of hair. "Raven tresses" require more time than "flaxen locks;" the sensitiveness of the skin has also to be considered. A small feather is a very good test for its action.

To make silk which has been wrinkled and "tumbled" appear exactly like new, sponge it on the surface with a weak solution of gum arabic or white glue, and iron it on the wrong side.

Scientific American.

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VOL. XVIII., No. 21....[NEW SERIES.]..*Twenty-third Year.*

NEW YORK, SATURDAY, MAY 23, 1868.

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TRANSMISSION OF POWER BY HYDROSTATIC PRESSURE.

Much interest has of late been manifested in England, in the subject of transmission of power by hydrostatic pressure. It is proposed to substitute this method for the old system of shafting, pulleys, belts, and gearing. It is claimed that it is more economical, costing less in the first instance, and losing less power from friction. All expense attendant upon the the proper aligning of the main shaft, and lubrication of the bearings, as well as the cost of hangers, etc. is obviated. Any direction may be given to the primal force by a curve in the pipes through which the water column passes. Reciprocal motion is obtained by the aid of a cylinder and plunger, which is precisely the same as that used for the well known hydrostatic press, if we except some slight modifications which do not affect the principle to any great extent. It is also claimed that motion can be transmitted at great distances without increasing the cost, except by the expense of lengthening the pipes, the multiplier of course to be stationed as near as possible to the point where the power is to be applied to work. The reciprocal motion of the piston is converted into a rotary motion, by the old method of crank and fly-wheel.

We know of no attempt to practically apply this principle in this country. The Hydraulic Cow-Milker, described in No. 18 of the present volume, indeed uses it so far as the transmission of a reciprocal motion is concerned, but no attempt has been made to convert it into a rotary motion. Many attempts, and some successful ones, have also been made to construct engines to be driven by hydrostatic pressure, but nothing like transmitting motion derived from other sources, by means of water columns, for the purpose of impelling shafting at a distance, has come under our observation.

For ourselves, we have but little faith in the ultimate adoption of this method. For long distances, the power required to impart a reciprocating motion to the column must be very great, and we think that the loss from friction would probably be more than is anticipated. The inelasticity of water, its great weight, and the difficulty of adjusting the first motor to changes, in amount of power required, which take place at distant points, on account of the momentum of the column, seem to us to be great obstacles. The subject is, however, one of great interest, and we shall watch its development in the hope that our fears in regard to its success may prove unfounded.

DOCKS AND WET BASINS FOR EAST RIVER, NEW YORK.

Whoever has visited and spent any time in the great commercial cities of London and Liverpool must have had his attention arrested and his wonder excited by the extent, solidity, and magnificence of the docks. They constitute one of the greatest attractions of either city. The contrast between these commercial facilities and those which serve the purposes of New York is painful to every thinking American. With a harbor unsurpassed in beauty and in value for commercial purposes by any other on the globe, our dock accommodations are of the most meager and rattletrap description.

We have been shown drawings made by Mr. G. W. Dow of New York city, proposing the construction of causeways extending from the Brooklyn to the New York shores, the spaces between the causeways forming immense water basins and the causeways themselves sustaining a double row of warehouses divided by a spacious roadway. The causeways are to be in sections allowing passageway for vessels, the connections between the sections to be made by drawbridges. Each section is to have flanking wharves on each side for the accommodation of vessels and their cargoes.

These are, in brief, the salient points of Mr. Dow's plan, and it looks beautifully on paper. It is, however, open to very serious objections, or, at least to very adverse criticism. Its provision of docking facilities is unquestionable, but whether it will, with its necessary draw bridges, accommodate the pedestrian and vehicular travel between the two cities may be somewhat problematical. The obstruction to the tide and currents and delay to vessels passing in or out are also considerations affecting the value of the project. However, we believe this plan worthy the attention of our engineers and business men and it should be thoroughly investigated and discussed. Certainly there is room for improvement to our harbor facilities, and other means than ferry-boats are required to connect New York and Brooklyn.

HYDROCARBONS—THEIR INFLAMMABILITY AND EXPLOSIVENESS.

The very general and rapidly increasing use of hydrocarbons for illuminating purposes, and the frequent deplorable accidents happening, either from careless use, or ignorance of their properties, necessitate a presentation of every item of knowledge concerning them that we can gather. We have written often, and sometimes quite at length, on this subject, but there still seems to be, on the one hand, an almost criminal neglect of proper precautions in their use, and, on the other, as foolish confidence in their perfect safety under all circumstances. The first can be remedied by a knowledge of their nature and qualities, and the second by instructions as to their use. Probably the disinclination to take the trouble to test the quality of the liquid, and a desire to get the best article for the price of the poorest and most dangerous, is an indirect, if not a proximate, cause of some of the serious and even fatal accidents our journals record. On pages 180 and 217, current volume, we gave directions for ready and reliable tests of the quality of hydrocarbons; to those we refer our readers.

The use of different terms to designate similar substances are calculated to befog and confuse the public, and we are pleased to see that the Boston Institute of Technology have thought the matter of sufficient importance to appoint a committee on the subject, a portion of whose report we herewith reproduce. The committee say that, "after careful examination they find that the term naphtha is a general term, and covers both the other terms, gasoline and benzine. The word naphtha is one of great antiquity; it has long been applied to certain springs in Persia, from which is obtained a volatile, limpid, bituminous liquid, having a strong, peculiar odor, and generally a light, yellow color.

"When the art of distilling coal tar became known, the same term was applied to the more volatile products of such distillation; the heavy products being called dead oil and asphaltum. The term was next applied to the most volatile products from the distillation of coal for oil. When petroleum took the place of coal for this purpose, the term naphtha was again used to distinguish the more volatile, so called 'light' products from the heavier ones. This is still its use, and in our market all volatile products of petroleum lighter than illuminating oil (or what is known among our dealers as 'kerosene,' which has a specific gravity of 8-10, or 45 degrees by Beaume's Hydrometer), are designated by the general name of naphtha.

"Of the naphthas, those of a gravity from 45° to 80° Beaume are often, though improperly, called benzene or benzole. True benzole is a product of coal tar, and differs essentially from any liquid obtained from petroleum. The term 'gasolene' is applied to all naphthas having a specific gravity lighter than about 80 deg. Beaume, the lightest known being about 90 deg.

"This committee find, however, by reference to Prof. C. M. Warren's unpublished determinations, that none of these products are simple bodies. All of them are mixtures, in indefinite proportions, of at least twelve hydrocarbons, distinguished from each other by their boiling points, which vary from 32 to 318 deg. Fah., and are nearly as follows: 32, 47, 86, 99, 142, 156, 195, 208, 247, 261, 303, and 318 degs.

"While gasolene contains mostly those hydrocarbons whose boiling points are low, kerosene is composed chiefly of those whose boiling points are comparatively high. The isolation of any one of these products being a matter of great difficulty, few have attempted it, and your committee have had to rely on the labors of a fellow member for much valuable information on the subject. To completely separate the constituents of any sample would be the labor of many months.

"Your committee also report that there is great danger from the careless use of naphtha—1st, on account of its great inflammability; and 2d, from the liability of forming explosive mixtures of the air and vapors. The liquids are not in themselves explosive, neither are the vapors; but both are highly inflammable. If the liquids escape by any means and form pools, or saturate porous substances, the near approach of flame may cause the vapor to ignite and set fire to the whole exposed surface of the liquid.

"The vapors, it is true, are not explosive, but they become so when mixed with air in certain proportions, and this committee would particularly call the attention of the society to the fact that such mixtures are more likely to be formed in what are called empty cans, which have contained hydrocarbons, and from their supposed emptiness are imagined by ignorant people to be free from danger. A light may be applied with but little or no danger to a vessel full of gasolene or gasolene vapor, or even such a mixture of vapor and air as would produce lighting gas; but in case the vapor be mixed with a sufficient quantity of air, it would instantly explode."

The statement in the above that "the liquids are not, in themselves, explosive, and neither are their vapors," should not be understood as an assurance that there can be no danger in the use of these liquids. We have seen, repeatedly, a lighted match dropped into a lamp or other vessel full of naphtha, benzine, gasoline, or whatnot, sometimes not lighting the the liquid, but if so, the flame being easily extinguished by a blast of the breath. In our opinion such a test proves simply nothing. The vapor from any hydrocarbon requires the admixture of oxygen to render it explosive, and a certain quantity to make it even inflammable. If this vapor should be confined in an air-tight vessel it would neither explode nor burn. To burn, it must have oxygen; to emit light, a larger proportion of oxygen, and to explode, a still larger proportion. Many will, undoubtedly, as many have, be deceived by these so-called tests; but, after all, more danger is incurred by the inflammability of hydrocarbon and its vapors than by its explosive qualities. Care in storing, care in handling, and the use of a proper lamp for burning these liquids are what are needed to render their employment safe.

FOREIGN MATTERS IMBEDDED IN GROWING TIMBER.

An exchange relates that on sawing a white oak log at a saw mill the saw struck a "hard substance, which, on investigation, proved to be a stone. The log was some eighteen inches in diameter at the part where the saw had penetrated, and the stone, which weighed about a pound, was found imbedded in the center of the log. The wood was found to be sound and solid, with no cavity or space in which a stone could be placed. It was found that the saw had made an incision in the stone of about half an inch before it could be stopped. The stone at present lies imbedded in the wood in the same position in which it was found, no effort having been made to remove it, and in fact the wood had grown round the stone so closely that it cannot be removed."

How that stone became imbedded in the wood we are not prepared to explain. It might have been lodged in a crotch or cleft, which afterward closed up. It being in the center of the log would seem to give some plausibility to the supposition, as it might have been placed among the clustering branches of the growing shrub and gradually closed in until it became seated in the very heart of the tree.

Appropos to this is a fact of which we are cognizant, partially. Thirty one years ago in company with a youthful companion we stuck a common pin in a young white pine at the intersection of the lower branches with the trunk. We took the bearings of the tree and marked those adjacent so it could be identified after the lapse of years. One year ago the tree was felled and our companion happened to oversee the clearing of the ground. He identified the tree, and it was brought to the mill and sawed up. Strange enough, the pin, perfect in form and very slightly corroded, was found by a carpenter in planing the stock, and there could be no mistake about its identity as the lumber sawed from the tree was watched through every stage by one of the parties to this boyish experiment.

JUDGE FISHER ON REISSUES, SUSPENSION OF A GOOD RULE.

The Patent Office has abrogated its recent rule in respect to suspending action upon applications for reissues for thirty days. The recent decision of Judge Fisher pronouncing this rule of the Patent Office not justifiable under the statute, may be legally correct, although we differ from him on this point.

It has never been questioned but that the Commissioner has discretionary power to adopt rules and regulations for the management of the Office not expressed in the Patent Laws, and this rule, for suspending Reissues for a limited time and publishing the proposed new claims that parties interested might advance evidence to the Office showing cause why such claims should not be allowed, was one of the best and most practical that have been recently adopted. Of course the sewing-machine interest and some other large monopolies were opposed to this rule, for it prevented their slipping through broad claims unbeknown to the public; but all honest inventors approved of the plan of publishing claims for reissue before official action upon them, and we have never known of any detriment arising to any one in consequence, who was justly entitled to the claims asked for under a reissue. But Justice Fisher's decision sets aside this rule, and hereafter reissue cases will be acted upon immediately on their receipt, and no notice is to be taken by the examiner of testimony adverse to the application.

LECTURES ON THE ANIMAL KINGDOM.

The talented naturalist Mr. Waterhouse Hawkins, of London, is now engaged in delivering, in Plymouth Church, Brooklyn, the course of popular lectures on natural history which he lately delivered with such acceptance in Cooper Institute, this city. The familiar, yet spirited style with which the speaker treats his subject, has attracted large, attentive, and, what is still more difficult of accomplishing, thoroughly interested audiences. The wonderful faculty which Mr. Hawkins possesses, of being able to draw upon the blackboard, with the greatest ease and rapidity, sketches illustrative of the subject under immediate consideration, is an invaluable gift, by the exercise of which he is enabled to control the attention of his hearers to a far greater degree than is possible with the best executed of ordinary lecture room diagrams. The most indifferent of listeners cannot fail of being entertained and instructed when ear and eye are both engaged in following the animated description, and watching the skill with which the structure of the animal is shown in detail, until finally, when the framework is sur-

rounded by the appropriate outline, the creature appears faithfully delineated before him.

From the nature of the lectures it is plain that no report can do them justice. So, without attempting either to present a faithful synopsis or to confine ourselves to following out the speaker's design of showing the unity of plan running through the animal kingdom, we shall endeavor to give our readers a general outline of the lectures, and report some of the many curious facts and observations brought forward by the lecturer.

History is divided into two great sections; the one division records the works of man, the other, concerning which we know too little, is natural history—the history of the works of God. The animal kingdom is properly named a kingdom; all human beings are kings and queens over the lower creatures, power of life and death, by Divine decree being given them over the beasts of the field, the fowl of the air, and the fish of the sea, and therefore it is but right that we should know something of the conditions of our subjects. In taking a general survey of the animal kingdom, the simplest form of life should first engage the attention, then we may rise to the higher forms. Yet the terms high and low, the speaker wished his audience to distinctly understand, simply had reference to the grades of complication in structure, for the very simplest forms are entirely perfect in themselves, the idea of a development of types running through the animal kingdom being a theory which the speaker utterly repudiated. Beginning with the lowest or simplest forms, Mr. Hawkins drew on the blackboard and explained the character of the coral animal, crinoids, and jelly fish.

While describing the sea-anemone the speaker mentioned a fact that would indicate that this polyp is possessed of far more intelligence than is usually accredited to his family. One of the animals kept in confinement was regularly fed by its owner with small pieces of meat, by means of a pair of forceps. On one occasion Mr. Hawkins attempted to give the animal his customary food supply, but the creature refused to recognize his kind attentions, and stubbornly drew in its arms until its owner appeared, when, after the usual flourishing of the forceps had been executed, the creature received and disposed of its food with considerable avidity. Here was plainly an exhibition of remembrance and recognition, faculties not generally believed to belong to this low order of beings.

Passing to the higher division of the articulates, the structure of various orders of this group of the animal kingdom was finely illustrated. The vertebrates were treated in the same manner. Beginning with the fish, the position of the brain was indicated, the nervous and circulatory systems were sketched, the organs of sense placed in the relative position they occupy in the fish, the rib structure and fleshy parts added, and finely the outline drawn, much to the gratification of the audience. Retaining the general structure of the fish, by a slight modification of the feet, the head and tail, an alligator was shown; by a still further modification and erasure, a well formed pig appeared upon the blackboard, which, in turn, was skillfully converted into an ostrich.

The second lecture of the course was devoted to a consideration of the structure and habits of the extensive family of fishes. The speaker reminded his audience that on the previous occasion he had endeavored to put before them the relationship which existed between the four great divisions of vertebrates, beasts, birds, reptiles, and fishes, and to show the wonderful similarity in their structure, showing also the various modifications in form which qualified them for existence in water, air, or on the earth. As a class, fishes are constituted for existence under the water; but in some instances limbs are furnished, by which they are enabled to leave the water, and even to sustain their bodies in air while seeking their prey. Beginning with the egg, the various successive stages of development, and the internal arrangement of the matured fish, were fully illustrated, and the peculiarities of several curious species of the finny tribe described at length. Speaking of the whale, the lecturer described a chamber existing in the upper part of the head, and forming a part of the breathing apparatus of the animal. Acquainted with this fact, new interest is added to the story of Jonah, and the objections on the ground that the throat of the whale being only a few inches in width, the passage of a man's body would be a physical impossibility, is easily explained. There is no necessity for supposing him swallowed, we need only imagine him taking up his abode in this commodious room, where he could well be accommodated for several days. With a head the third of the length of the entire body, the place we suppose the prophet to have been in might well be called the belly, and the story throughout be consistent with natural facts. And this shows the use of a fuller and more accurate knowledge of natural history than is generally attained.

MANUFACTURING MINING, AND RAILROAD ITEMS.

The Sheffield steel works, at Pittsburgh, Pa., are among the largest in this department of manufacture in the country. They run night and day, employ 250 hands, and have a capacity of fifteen tons of steel per day. The works are now building the largest steel mill in the Union for rolling steel, which will contain the largest chill rolls in the world. This new mill will be used for rolling circular saws from four to six and one half feet in diameter; plate, slab, and sheet steel.

A corresponent thinks it not a little singular that in view of the number of appalling accidents resulting from the plunging of cars down railway embankments, the idea has not been suggested of providing a third elevated rail running over the center of the track, to be grasped by extra horizontal wheels, and thus effectually prevent the cars from leaving the track, should a rail or axle break. The idea, although not new, is an excellent one, but economical considerations always appear of such paramount importance in the eyes of railroad corporations whenever any such life-saving plans are suggested, that we presume there is little prospect of so sensible a device being speedily adopted.

We have before us a statistical table showing the earnings of thirteen leading railroads of the land, for the past year as compared with the same for the year 1862. These figures indicate that in four years the roads have increased their earnings nearly eighty per cent, a fact of great importance for those political economists who read in these figures gratifying evidences of increasing national wealth and prosperity.

We are in receipt of an interesting description of the largest bolt works in the world, that of Messrs. Lewis, Oliver & Phillips, located at Pittsburgh, Pa. By the aid of machinery invented and perfected by a member of the firm, eighty thousand bolts are manufactured per day, worked up from a daily supply of twenty three tuns of iron, and furnishing employment to 364 hands. The rapidity with which the various operations of bolt making are performed is surprising, the iron being driven through a score of machines, fashioned into bolts and nuts, and packed ready for shipment in the short space of three hours.

At Glascow, Scotland, the Garnkirk Railroad passes by means of a tunnel four hundred feet long, under the Moreland Canal, and over the tunnel of the Edinburgh and Glascow railroad. The two tunnels stand secure, tier over tier. A similar feat was performed by Stephenson, in Derbyshire, England, a railroad being carried over a bridge which there spanned the river Amber, and at the same point, under the aqueduct of the Crawford canal. River, bridge, railroad, and canal were thus piled one above the other, four stories high. Such another curious complication in railroad engineering probably does not exist.

The New Haven Clock Company are said to be the largest manufacturers of clocks in the United States. They employ 250 hands, and produce about 150,000 clocks per annum. So perfect is the system now adopted in this business, and the facilities for manufacturing, that an ordinary one-day brass clock can be made at a first cost of less than fifty cents. In regard to the rapidity of work, some of the workmen can take brass in the sheet, press out and level under the drop, then cut the teeth and make all of the wheels for five thousand clocks in one day. There are eight to ten wheels in every clock, and in an eight-day clock, more. If the separate parts were not made for almost nothing, the clocks could not be sold so cheap when finished.

The Mexican silver mines, particularly those in the district of San Luis Potosi, seem to be in a very prosperous condition, if we may judge from the report of the State Inspector of Mines for that district. It appears that one mine in the neighborhood of Charcas, worked at an expense of $170,000, since the first of January, 1862, has yielded silver during that time to the value of $5,460,000. The Santa Rosa Mining Company is drawing out $95,000 worth of ore per week. Its works employ 460 hands, at the rate of thirty-seven cents per day, and the expenses amount in the aggregate to about five per cent of the value of the silver taken out.

We were at fault in announcing the passage of the Arcade underground railroad bill in the New York Legislature, the statement being made on the authority of several daily papers, whom we supposed to be well posted on the subject. It now appears that the bill was lost in the Senate, Trinity Church corporation having the credit of killing it. Several engineers in their interest testified that if Broadway was excavated in front of the church, the steeple—275 feet high—would topple to the ground. The Central underground company have now the entire field to themselves.

The New Haven railroad company, after a three months' trial of the English system of taking up and delivering the mail bags without stopping their trains, pronounce the plan an utter failure.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING MAY 5, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
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On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
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On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

77,433.—DRAFT ATTACHMENT.—M Adsit, Forrest, N. Y.

I claim the plates, b b, sliding in grooves upon the top and bottom of the double tree, B, in front of the hand, D, said plates, b, secured together at their ends and centers by the bolts, c c, which slide in the slots, d f, of the double tree, all constructed and arranged to operate as herein described for the purpose specified.

77,434.—SPLINT PLANE.—D. E. Aiken and A. A. Aiken, Adrian, Mich.

We claim the wedge, C, of the plane provided with a longitudinal groove in its under side, in which is secured one end of the spring, E, whose free end is adjusted to regulate the thickness of the slat to be cut by the screw, G, passing through the wedge, all constructed, arranged, and operating as described for the purpose specified.

77,435.—SHEEP HOLDER.—C. Albert, Harrisville, Ohio.

I claim the adjustable standards, E, arms, F, in combination with the socket stays, D, and rollers, C, in the manner as and for the purpose set forth.

77,436.—CUE TRIMMER.—David Aldrich (assignor to Phelan & Collender), New York, N. Y.

I claim, 1st, The hollow hand piece and cue holder, with its table or slide holder, b, in combination with a reciprocating carriage, provided with a cutter, substantially as and for the purposes set forth.

2d, The employment, in combination with the hollow cue holder and hand piece, of a reciprocatory cutter carriage and the driving lever, D, the whole arranged to operate in the manner and for the purpose substantially as described.

3d, The removable cutter, g, in combination with the cutter carriage and table, b, substantially as and for the purpose described.

77,437.—THIMBLE PULLER.—A. F. Allen, Providence, R. I.

I claim the combination of the expansible catches or jaws, E E E, or their equivalent, the expending wedge, F, the sleeve, M, and the screw mandrel, H, and nut, P, constructed substantially as described for the purpose set forth.

77,438.—CAR SPRING.—Oliver E. Allen, New York City.

I claim, 1st, A spool for a car or other spring, composed of an india rubber center, surrounded by woollen yarn or other exterior elastic covering, substantially as described.

2d, A car spring, composed of vulcanized rubber, and wound around by woollen yarn or other exterior elastic covering, and placed and used in a metallic case or exterior, substantially as herein described.

77,439.—SAW.—Solomon Anderson, West Burlington, N. Y.

I claim the perforations, c', in the saw plate, A, having upper and lower cutting edges, d e, and used either with or without the cutting edges, f g, of the holes, b, substantially as and for the purpose set forth.

77,440.—CLOTHES DRYER.—Charles Bange, St. Louis, Mo.

I claim the fixed cylinder, D, revolving perforated cylinder, E, uprights, 1 2 3 4 &c., hoop, s, chains, d d' d'', and collar, c, all in combination with the wheels, H K p b and F, and their respective shafts, when arranged in relation to each other and the framework of the machine, substantially as and for the purpose specified.

77,441.—OPEN RING.—Andrew H. Bixler, Carlisle, Pa.

I claim the elliptical parts, A A and B B, joined by the hinge and pin, C, and the trapezoid extension, D, of the part, A A, all constructed and combined in the manner and for the purpose herein set forth.

77,442.—SOAP STAND.—J. D. Blake, Laconia, assignor to himself and J. A. Sanborn, Holderness, N. H.

I claim the base plate, A, provided with stationary clips, B B, movable clip, C, and clamp lugs, m m, together composing a soap stand, substantially as herein specified

77,443.—BUTTON.—Ernst Brodt, New York City. Antedated April, 25, 1868.

I claim a button shell, formed of stiffened woven or fibrous material, pressed up to the required shape between dies, as specified, in combination with a base or shank, substantially as set forth.

77,444.—BASE BURNING STOVE.—Willis S. Bronson, Hartford, Conn.

I claim, 1st, The double ventilated top, c, which covers the combustion chamber, b', and forms a support for the magazine or reservoir, d, substantially as and for the purpose described.

2d, In combination with the double ventilated plate, c, and magazine, d, the conducting tubes, f, and double movable damper, and dividing flue plates, g, substantially as and for the purpose described.

3d, The arrangement of the oven, k, directly over and in combination with the double movable damper and dividing plates, g, substantially as and for the purpose described.

4th, The double movable damper and dividing flue plate, g, arranged in and forming the smoke and hot air flues, e e, substantially as and for the purpose described.

77,445.—FIRE GRATE.—Willis S. Bronson, Hartford, Conn.

I claim the hollow stationary hub, b c, constructed and arranged upon the supporting bar, a, substantially as and for the purpose described.

The grate, f, as constructed, in combination with said supporting bar, a, substantially as and for the purpose described.

77,446.—HARNESS FRAME FOR LOOMS.—Darius C. Brown, Lowell, Mass.

I claim the improved harness or heddle frame, as made with elastic connection bars, C C, substantially as and for the purpose specified.

Also, the combination, with the bars, A B, and brackets, and string bars supported in such brackets, of the elastic connection bars, C C, substantially as herein shown and described.

77,447.—DEVICE FOR SOLDERING THE LIDS OF CANS.—Frederick W. Brown, Philadelphia, Pa. Antedated April 21, 1868.

I claim the combination, substantially as described, of the block, A, instrument, D, and chain, C, for the purpose specified.

77,448.—STOP VALVE.—Silas H. Brown, Troy, N. Y.

I claim, in combination with a valve, B, and actuating stem, D, a movable or sliding lever brace, C, so attached to and operating with the valve, that when said valve is closed, said lever braces it tight on its seat, and when said valve is open, said lever moves with it, so as to leave an entirely unobstructed passage way within the pipe, in manner substantially as herein described, and for the purpose as set forth.

Also, in combination with said valve, B, its stem, D, and sliding brace lever C, the grooves or shoulders, E E, of the valve chamber, A, said grooves or shoulders being inclined relatively to the valve seat, H, substantially as and for the purposes described.

Also, the combination and arrangement of the valve, B, its stem, D, the sliding, movable brace lever, C, and the grooves or shoulders E E, when applied in manner substantially as described, and operating for the purposes as set forth.

77,449.—MACHINE FOR SAWING LATH.—Theodore Bruno, Saginaw, Mich.

I claim the gage, M, working in the longitudinal slot in front of the guide, L, and resting upon the spring, N, operated by the lever, O, whereby the number of strips to be cut from the board at one operation is regulated, as herein shown and described.

77,450.—DOOR DIRECTORY.—Lewis Burger, Springfield, Ill., assignor to himself and Isaac L. Hamburger, Albany, N. Y.

I claim, 1st, A door directory, consisting of a box, with perforated dial plate, A, and of various rollers, aprons, and hands, to indicate time and date of return, and other notes, substantially as herein shown and described, the rollers, aprons, or hands only being adjustable, by means of a suitable key, as described.

2d, The combined cover and slate, G, when the same is arranged on a door indicator, substantially as herein shown and described.

3d, The letter box, H, card holder, I, and pencil holder, J, when arranged in combination with the door indicator, all made and operating substantially as and for the purpose herein shown and described.

77,451.—COMBINED LOW WATER DETECTOR AND SAFETY VALVE.—Daniel Burns, Bay City, Mich.

I claim the arrangement of the within described box, G, filled as specified, with the levers, D I K, the valves, A H, the weight, T, and the crotcheted slide, E, substantially as and for the purpose set forth.

77,452.—RACK FOR BILLIARD CUE.—Victor H. Buschmann, Baltimore, Md. Antedated April 25, 1868.

I claim so constructing a billiard cue receptacle, that the weight of the cue, when placed therein, shall close it, and when the cue is withdrawn the receptacle will open, and remain open, for the return of the cue.

77,453.—MACHINE FOR TAPPING AND DRILLING.—George Cahill (assignor to Isaac G. Johnson, J. F. Hunter, and Peter P. Keller) New York, N. Y.

I claim, 1st, The combination of the collar, C, friction band, c, forced lever, D, fingers, e e, shoulder, a, jointed arm, E, or their respective equivalents, all constructed and arranged in the manner and for the purpose specified and set forth.

2d, The system of levers, G, cam, H, and pin, I, when constructed, combined and applied to the forked spindle of a tapping machine, in the manner and for purpose specified and set forth.

3d, The forked lever, D, movable collar, C, slotted strap, L, the lever arms, K K, rods, M M, arms, N N, shaft, O, disk, P, all constructed and combined, and all applied to and used upon the forked spindle of a tapping machine, in the manner and for the purpose specified and set forth.

4th, The improved tapping machine, consisting of the several parts hereinbefore specified, all constructed and arranged substantially as described.

77,454.—FEED WATER HEATER FOR STEAM GENERATORS.—George Candee, Berlin Hights, Ohio.

I claim passing the feed water or air through successive chambers, (heated as described,) of a lower to a higher temperature, in the manner and for the purposes herein set forth and described.

77,455.—IMPLEMENT FOR SHARPENING WATCH WOOD.—Charles P. Carter, Poughkeepsie, N. Y.

I claim the block, a, knife, b, and screw, c, when arranged and combined to operate substantially the same as shown and described.

77,456.—RAILROAD.—John B. Christian, Mount Carroll, and John Gunn, Salem Township, Ill.

We claim 1st, The construction and arrangement of a railroad track, composed of hollow rails, A A, placed inside of the usual T-rails, substantially as and for the purposes set forth.

2d, The construction and arrangement of railroad cars, having two or more pairs of broad flanged wheels, B B, substantially as and for the purpose specified.

3d, The lever, H H, in combination with the spiral springs, O O, moving in the periphery of a circle, for the purpose substantially as set forth.

77,457.—BEDSTEAD FASTENER.—John C. Cline (assignor to himself and J. Moore Hendricks), Philadelphia, Pa.

I claim the device, consisting of the bolt, C, and tenon block, D, in one piece, and screw cap, E, in combination with the rails and parts of a bedstead, for fastening said rails and parts together.

77,458.—GRATE BAR.—Henry Collinson, Boston, assignor to himself and Samuel Vance, South Boston, and Samuel Vance, assignor to James O. Boyle, Boston, Mass.

I claim a grate bar, as made, with its air passages extended entirely across it.

Also, the arrangement of the transverse passages obliquely in the bar, in manner as specified.

Also, the grate bar, as made, with air passages extending across it, and to increase in width from their upper to their lower parts, as specified.

77,459.—WATER CLOSET.—George Conron, New York city.

I claim the valve chamber, E, pipe, D, pan, I, overflow pipe, C, and valve, A, all constructed and operating together substantially as shown and described and for the purpose set forth.

77,460.—CHURN.—A. L. Converse, Springfield, Ill.

I claim the outer gear wheels, I, central gear wheels, J K, beveled gear wheel, L, plates, G, bearings, M, and shaft, M, when arranged to operate upon the hinged rectangular central lid, C, as herein shown and described.

77,461.—POTATO WASHER.—O. H. Cooke, Morrisville, Vt.

I claim the combination of the perforated bottom, B, with or without the metal ring around its periphery, with the sharp-edged float, E, crank, D, and wooden cross piece, C, made, arranged and operating substantially as and for the purposes above set forth.

77,462.—CHURN.—Alpheus B. Corby, Binghamton, N. Y.

I claim, 1st, The escapement apparatus, consisting of the pallets, v v', cam, F, shafts, g G, and guides, m n, when used for the purposes described.

2d, The arrangement and combination of said escapement apparatus with the spur-wheels, W W', drum, R, ratchet-wheel, t, pinion, l, weight, T, pendulum, P, and frame, A B C D, substantially as and for the purpose set forth.

77,463.—EXTENSION STEP LADDER.—Lewis B. Covert, New York city.

I claim, 1st, A step ladder formed with the two part steps, b, extension pieces, c, and their steps, substantially as specified.

2d, The swinging steps, b, supported by the castings, g, in the manner specified, in combination with extension step ladder aforesaid.

3d, The extension legs, l o, in combination with the extension step ladder, provided with the swinging steps, as and for the purpose set forth.

77,464.—MECHANICAL MOVEMENT.—J. P. Davis, Stiles, Wis.

I claim, 1st, The recessed friction pulleys, D, and racks, a, operating substantially as shown and described, and for the purpose specified.

2d, The gear wheels, G G' H, substantially as shown and described, in combination with the friction pulleys, D D, as and for the purpose set forth.

3d, The pulley, I, belt, h, and fly wheel, substantially as shown and described, in combination with the recessed friction pulleys, D, and cross head, F, for the purpose of accomplishing the more perfect working of the parts, all as set forth.

4th, The cross head, F, cogs, n, friction racks, a, substantially as shown and described, in combination with the friction pulleys, D, all as and for the purpose set forth.

77,465.—CEMENT WATER PIPE.—Edwin Dayton, Meriden, Conn.

I claim, 1st, The short pipe, E, of tapering shape, fitting into the adjoining ends of the pipes, A B, to form a water tight joint, and coated upon the inner and outer sides equally with cement, substantially as herein shown and described.

2d, The packing ring or band, a, applied to the pipe sections, substantially as and for the purpose described.

77,466.—CHIMNEY CLEANER.—Thomas H. Donohue, Washington, D. C.

I claim, 1st, The combination of the fixed and sliding collars, B C, and their connecting arms, a b, with the bars or segments, c, pivoted together and supported on the shaft, A, for operating together, substantially as set forth.

2d, In combination with the bars or segments, c, connected and supported as described the braces, d, and sliding collar, E, all arranged and operating substantially as described.

3d, In combination with the adjustable expanding frame, constructed substantially as described, the detachable brushes, F, or scrapers, G, as and for the purposes set forth.

77,467.—WAGON BRAKE.—Claude Decreux, New York city.

I claim the adjustable rings, C C, on the hubs of the wagon wheels, when provided with lugs, b b, in combination with the oscillating bar, D, having lugs, d, all arranged and operating substantially as herein shown and described.

77,468.—MACHINE FOR CLEANING GRAIN.—Milton Eckley, Olney, Ill.

I claim, 1st, The arrangement of the fans, G, riddle, K, and compound cylindrical screen, D, substantially as described, for the purpose specified.

2d, The construction and arrangement of the fans, G, riddle, K, spouts, I J, compound cylindrical screen, D, and shafts, B F, substantially as described for the purpose specified.

77,469.—PROCESS OF CONVERTING CAST IRON INTO CAST STEEL AND MALLEABLE IRON.—Francis Ellershausen, Monrreal, C. E.

I claim, 1st, Converting cast or pig iron into cast steel or malleable iron by bringing it in a liquid state in contact with hot or cold solid oxides, substantially as herein specified.

2d, Bringing to an instantaneous uniform contact, at a sufficient heat, on a sufficiently large hot or cold surface of pure oxide, the carbon contained in molten cast iron, so as to cause a rapid, violent combustion of the carbon, substantially as described.

77,470.—MATERIAL FOR PURIFYING AND DECOLORING PETROLEUM.—John Ellis, New York city.

I claim, 1st, The method of preparing bones, animal charcoal, "Navassa phosphate of lime," and other phosphatic deposits, in the manner described in the foregoing specifications, as materials for filtering and bleaching petroleum and other fluids.

2d, For the purpose of filtering and bleaching petroleum and all the fluids produced from it, including residuum and the heavier oil, after the lighter fluids have been separated from it, the use of pure phosphate of lime and the commercial article, and also either and all, separately or combined, of the materials or substances, which result from treating bones, animal charcoal, Navassa phosphate of lime, or other phosphatic deposits, in the manner described in the foregoing specifications.

77,471.—MACHINE FOR THRESHING AND CLEANING GRAIN.

Wm. B. Emery, Albany, N. Y.

I claim, 1st, Combining with a self-cleaning threshing machine (in which the shoe and separator vibrate in opposite directions), an endless straw elevator, having an apron between it and the threshing cylinder, arranged substantially as and for the purpose specified.

2d, Deflecting the edge, B, of the apron upwards, substantially as and for the purpose specified.

3d, The beater, N, in combination with the elevator, D, and apron, b b, substantially as specified (whether the shoe and the separator vibrate in opposite directions or in unison).

4th, The lever, Y, of the bonnet, whereby the bonnet may be adjusted from the outside of the machine, substantially as and for the purpose specified.

77,472.—VISE.—Isaac Fisher, St. Louis, Mo.

I claim the improved vise, A, the same having two axes or centers of adjustment, arranged substantially as described.

77,743.—BEEHIVE.—W. A. Flanders, Shelby, Ohio.

I claim the honey comb foundation, B, when provided with a passage, x, and constructed substantially as and for the purposes herein specified.

77 474.—DOUBLE SHOVEL CULTIVATOR.—Simeon B. Forbes, New Cumberland, W. Va.

I claim, 1st, The combination of the sole, D, double winged point, E, and double mold board, F, with each other, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the adjustable brace, G, with the curved rear parts of the beam, A, and with the sole, D, substantially as herein shown and described, and for the purpose set forth.

77,475.—PAINT BRUSH.—Wm. H. Forker, Meadville, Pa.

I claim the solid wooden handle, A, of full length, with its conical ferrule, F, which in combination with the nut, C, operating on the cap, D, from above, hold all the parts firmly together, when constructed as and for the purpose set forth.

77,476.—NUT MAKING MACHINE.—Matthew H. Foster and Hubert C. Hart, Unionville, Conn.

We claim, 1st, Sliding bed, B, having button, G, and pivoted lever, I, thereon, with cam wheel, F, provided with studs, k k', all constructed and arranged substantially as described.

2d, Arranging the cams, a b c d e s s', so as to operate the cutter, n, slide, m, and punch, p, substantially as set forth.

3d, The improved nut machine, consisting of mechanism constructed, combined and arranged substantially as herein set forth

77,477.—WHIP.—James R. Gillett, Westfield, Mass.

I claim interposing a metallic lining, B, between the core, A, and covering, C, of a whip, substantially as and for the purpose herein shown and described.

77,478.—VELOCIPEDE.—O. T. Gleason, Farmington, Me.

I claim, 1st, The combination of four traction wheels, each having a friction boss, A, with the friction driving wheels, F, shaft, J, double crank, I I, and treadles, H H, all substantially as shown and described, and for the purpose set forth.

2d, The lever bearings, L, rods, N, and steering levers, E, all constructed and operating together substantially as shown and described and for the purpose set forth.

77,479.—FURNACE FOR MELTING GLASS.—Lyman B. Goodhue, St. Louis, Mo.

I claim, 1st, The shelf, D, of a furnace for melting glass, as shown and specified.

2d, The combination of a furnace for melting glass with immovable pots, as specified.

3d, The employment of reverberatory arches in a furnace for melting glass arranged as specified.

4th, The packing of a furnace for melting glass with sand as specified.

5th, A furnace for melting glass when constructed substantially as shown and specified.

77,480.—PORTABLE BATH HOUSE.—John Gourlay, Escanaba, Mich.

I claim the general combination and arrangement of the tank, I, slides, H H, pulleys, K K, J, cord, U, drum, X, gate, M, lever, n, crank, P, with house, A B O D E F G, substantially as set forth.

77,481.—LAMP BURNER.—John Gracie and Robert H. Boyd, Pittsburg, Pa.

We claim, 1st, A wick tube, m m', partially closed at its lower end by an indentation, z, or other equivalent device, substantially as and for the purposes above set forth.

2d, An opening or openings leading from the globe or oil receptacle of a lamp to the inside of the burner, each opening being covered with wire gauze, finely-perforated plate, or provided with a gas trap, and arranged within the burner, substantially as and for the purposes described.

77,482.—SUSPENSION RING.—H. S. Griffiths, Brooklyn, N. Y.

I claim the suspension ring for bu ineas cards, constructed and employed substantially as and for the purpose herein described.

77,483.—FUR CUFF.—Edward H. Hart, New York city.

I claim a fur cuff, provided with a connecting elastic band, E, in combination with the elastic fastening band, F, the whole arranged substantially as shown and described.

77,484.—MACHINE FOR SAWING LATH.—Isaac A. Hedges and Joseph M. Story (assignors to Lane & Bodley), Cincinnati, Ohio.

We claim, 1st, The pivoted weighted lever, I', and pulley, I, in combination with the belt, e, and pulleys, J, upon the feed rolls, all arranged and operating as described, whereby the belt is tightened, and the feed rolls held in their bearings, as herein shown and described.

2d, The journal boxes, j, for the shaft, K, secured by pivots, k, in the holders, l, having the vertical shafts, m, which are adjusted higher or lower in the framing, as herein described, for the purpose specified.

77,485.—STREET CAR.—John I. Herrick, Milwaukee, Wis. Antedated April 28, 1868.

I claim, 1st, Runners, D, constructed and connected substantially as and for the purposes set forth.

2d, In combination with said runners, the attaching apparatus, E G and H, and the hooks and supports, substantially as and for the purpose set forth.

3d, Platform or bottom, A, wheels, B, and runners, D, in combination substantially as and for the purpose set forth.

77,486.—REAPING MACHINE.—Reuben Hoffheins, Dover, Pa. Antedated April 22, 1868.

I claim, 1st, A "forward-cut" harvesting machine which has its finger-beam or cutting apparatus hinged to a frame, which articulates on the axle of the driving wheels, without materially affecting the position of the draught frame and tongue, and to which finger-beam is attached a platform carrying a circularly-moving sweep rake, said harvesting machine also having a device for adjusting the cutting apparatus, and a seat for the driver, such seat being in such relation to the adjusting device that the driver can raise and lower the cutting apparatus, platform, and rake, while the machine is in operation, and while he is seated substantially as set forth.

2d, The combination of a forward-cut hinged cutting apparatus, a frame articulating on the main axle, a quadrant platform, a sweep rake, and a reel moving in harmony with the platform and cutting apparatus, a driver's seat on the draught frame, and a device for raising and lowering the cutting apparatus, platform, rake, and reel, while the machine is in motion, and while the driver is seated, substantially as set forth.

3d, A circularly-moving sweep rake, a hinged platform of quadrant form, and a hinged finger-beam, all connected together and moving in harmony with one another, as the platform and finger-beam are caused to rise and fall by the undulations of the ground, in combination with a draught frame of a "forward-cut" harvester, which has two supporting wheels applied on a single axle, and which also has a frame and tongue hinged so as to articulate independently of the frame to which the finger-beam is hinged, and which articulates on the said axle, substantially as set forth.

77,487.—DITCHING AND GRADING MACHINE.—Francis M. Howard and Daniel W. Avery, St. Paul, Ind.

We claim, 1st, The adjustable slotted guides, m, in combination with the plow or cutter, e, substantially as and for the purposes set forth.

2d, In combination with the above, and with the toothed wheel, g', and shaft, G, the jaws, s, riveted to the belt, B, and the pivoted carrier-beam, b, all constructed, arranged, and operating as and for the purposes set forth.

77,488.—COMBINED COAL HOPPER AND PLATFORM SCALE.—Frank E. Howe, New York city, and Lindsay I. Howe, Boston, Mass.

We claim the arrangement of the hopper, F, in the frame, E, supported upon the scale platform, D, when such hopper is adapted to discharge the coal into the hopper, I, passing directly through the scale platform, D, as herein shown and described.

77,489.—BOOT FORM.—Jarvis Howe, Milford, Mass.

I claim, 1st, As an article of manufacture, a boot form, having a metal edge, substantially as and for the purpose specified.

2d, The combination of the parts, A B and C, substantially as and for the purpose specified.

3d, The thimble, when combined with a plate, having lugs and the notches, substantially as and for the purpose specified.

4th, As articles of manufacture, the parts, A and B, when constructed and arranged for use on the part, C, each substantially as described.

5th, The arrangement of the piece, D, in the chamber, substantially as shown.

6th, A boot form, the leg and foot parts of which are separate pieces, united together by a third piece, substantially as described and for the purpose specified.

77,490.—GRAIN SEPARATOR.—Sidney S. Hurlbut, Cordova, Ill.

I claim, 1st, The combination of the screening shoe, constructed and operating substantially as described, with an elevator, which leads back into the hopper, and with a cleaned-grain discharge passage, substantially as described and for the purpose set forth.

2d, The employment of an elevator, which will return that portion of the wheat which escapes from the screens in an unclean state back to the hopper to be re-screened, substantially as specified.

3d, The combination of the screens L, p and r', the short screens, s t, the cut-off, T, and the gage, V, with means for conveying the clean wheat out of the machine, and also for conducting back to the first screen, L, the wheat which is mixed with foreign substances, substantially as described.

77,491.—BEDSTEAD FASTENING.—Joel C. Jackson, Rochester, N. Y., and Frederick J. Jackson, Danbury, Conn.

We claim the bedstead fastening, formed of the inclined hooks, c, with their threaded shanks, c', screwed into the ends of the rail, as set forth, and entering corresponding holes in the posts, as specified.

77,492.—FENCE GATE.—Jasper S. Jewett, Ottawa, Ill.

I claim the two gates, C C, the rods, I I, the levers, J J, the levers, M M, the hollow casting, L, the ropes, O O, and the ropes, O' O', when combined with each other in a double fence gate, and constructed substantially as and for the purpose described in the foregoing specification.

2d, The catches, Q Q, the ropes or chains, S, the timbers, H H, the springs, R R, and the springs, U U, when combined with each other in a double fence gate, and constructed substantially as and for the purpose described in the foregoing specification.

77,493.—BOSOM PAD.—Albert H. Johnson, Hartford, Conn.

I claim, in combination with an inflated elastic bosom pad, the supporting springs, a a, arranged as herein shown and described, and for the purposes specified.

77,494.—CORN HUSKER, SHELLER, ETC.—Martha Jones, Amelia county, Va.

I claim, 1st, A machine, so constructed as to be capable of husking the ears of maize or indian corn, and, at the same operation, cutting up the husks, for the purposes set forth.

2d, A machine, so constructed as to be capable of husking and shelling the ears of maize or indian corn, and, at the same operation, cutting up the husks, for the purposes set forth.

3d, A machine, so constructed as to be capable of husking and cutting up the husks of maize or indian corn, and, at the same operation, separating the cut husks from the ears, for the purposes set forth.

4th, A machine, so constructed as to be capable of husking, shelling, and cutting up the husks of maize or indian corn, and, at the same operation, separating the cut husks from the corn, for the purposes set forth.

5th, The knives, c c, arranged spirally on the wheel, in combination with the projections, b b, substantially as described.

6th, The knives, c c, in combination with the projections, b b, for tearing and giving a rotary motion to the ear, and the projections, d d, for shelling the corn, substantially as described.

7th, The knives, c c, arranged spirally on the wheel, in combination with the projections, b b, and separator, substantially as described.

8th, The knives, c c, in combination with the projections, b b, for husking, and projections, d d, for shelling, and separator, substantially as described.

9th, The knives, c c, arranged spirally, and attached separately to the face of the wheel, as and for the purposes set forth.

10th, The wheel, B, provided with the projections, b b and d d, and spirally arranged knives, in combination with the spout, s, and separator, substantially as described.

77,495.—WOOD TURNING LATHE.—S. U. King, Windsor, Vt.

I claim the combination of the centralizers, their levers and centrifugal weights, with one or more cutters, and a wheel having tubular journals, or the equivalents thereof, the whole being arranged substantially in manner and so as to operate as and for the purpose hereinbefore described.

77,496.—HORSE HAY FORK.—Hack Krafft, Mulberry, Pa.

I claim, 1st, The centrally-arranged vibrating cross head, C', transverse connecting rods, m m, rocking links, d d, vertically-sliding pivoted legs, c c, and the forks, b b, in combination with the frame, A A', the whole arranged and operated in the manner shown and described.

2d, The latch lever, D, and pin, g, applied to the frame A A', in combination with a lever, C C', connected to vibrating points, b b, substantially as described.

77,497.—TRAVELING BAG.—Jacob Lagowitz, Newark, N. J.

I claim, 1st, An automatic device for closing traveling bags, consisting of the links or rings, a a, to which the ends of the chain or strap handle, B, are secured, and which carry the arms, b b, that fit over the sides of the bag, substantially as herein shown and described.

2d, The above in combination with the spring, c, made as set forth.

77,498.—LOOM FOR WEAVING GARMENTS.—Samuel Leather, Dalton, England.

I claim, 1st, The combination of the sliding cams, H, shaft, b, gear, G', and worm wheel, G, with the needles, d, and guide rods, c c, for weaving the necessary pattern, substantially as herein shown and described.

2d, In combination with the above, the shaft, a, screw worm, G, and pinion, G', substantially as and for the purpose herein shown and described.

77,499.—CURTAIN FIXTURE.—J. D. Legg and I. W. Legg, Long Eddy, N. Y.

We claim, 1st, Connecting the roller, B, through the medium of tapes, c c, to springs, C C, secured to the upper part of the window frame, in connection with the hooks, l l, and loops, m m, or other suitable fastening for securing or holding the lower end of the shade, and the cord, D, on the pulley, h, on the roller, all being arranged to operate substantially as and for the purpose set forth.

2d, The clamp, E, when used in connection with the cord, D, of the shade roller, B, connected to the springs, C C, substantially as and for the purpose specified.

77,500.—FARM WAGON.—Charles Mahan, Grand Island, Cal.

I claim, 1st, The frame, consisting of the cross pieces, J J', and central rail, K, as arranged, in combination with the box, I, axle tree, D, wheels, C, and reach, H, in the manner and for the purpose substantially as set forth.

2d, The sliding hook, A', when constructed in the manner and for the purpose specified.

3d, The box, A, when the sides of said box are provided with cleats, C', notches, b, and spring catches, c, in the manner and for the purpose set forth.

77,501.—GRAPPLE FOR SUNKEN VESSELS.—Joseph T. Martin, New York city.

I claim a marine grapple, consisting of a solid beam, A, to which the levers, C, carrying the grappling jaws, B, are pivoted, when said bars are adjustable toward or away from each other, on the beam A, and also up and down adjustable on the same, substantially as and for the purpose herein shown and described.

77,502.—MACHINE FOR FORMING PASTEBOARD BOXES.—C. A. Maxfield, New York city. Antedated April 23, 1868.

I claim the former, c, in combination with the folders, 2 3 4 5, substantially as specified, so that the folding of a box or box envelope is effected by driving the previously-cut sheet of material through between said folders, as set forth.

77,503.—EXTENSION PIPE COUPLING.—James McCarthy, New York city.

I claim, 1st, An extension pipe coupling, made by connecting the tubular pieces, A and B, substantially in the manner set forth.

2d, The above in combination with the jam nut, C, made as herein shown and described.

77,504.—ATTACHMENT FOR PENDULUM CLOCKS.—O. P. McDonald, Carcondale, Ill.

I claim the combination of the rods, A B, of different metals, having unequal expansibility, with the pendulum rod of a clock, substantially as and for the purpose specified.

77,505.—RAILROAD TRUCK.—David McFarland, Worcester, Mass.

I claim, 1st, The combination, with the axle or journal of a set of car wheels, of an axle protector or guard, substantially as and for the purposes set forth.

2d, The combination, with the axle of a set of car wheels, of a tubular protector, for the purposes set forth.

3d, The combination, with the axle of a set of car wheels, of a guard piece, E, or its equivalent, on each side of the journal or axle, for the purpose of preventing the deflection of the axle, in case of it breaking.

4th, The combination, with the axle, B, and wheels, A A, of the tube, D, clamping pieces, E E, and cross supporting pieces, F F, substantially as and for the purposes set forth.

5th, The combination, with the truck and wheels, of a wheel protector, shield, or cover, H, substantially as and for the purposes set forth.

77,506.—BLACKING BRUSH.—Wm. C. McGill, Cincinnati, Ohio.

I claim, 1st, In combination with the spreading brush, the cover, made and operating substantially as and for the purpose herein described.

2d, The spring standards, D D', serving the double purpose of journaling the said brush and of holding while permitting the adjustment of the blacking box, operating substantially as herein shown and described and for the purpose set forth.

77,507.—COFFEE AND TEA POT.—Shannon McGuffin, Rising Sun, Ind.

I claim providing a coffee or tea pot, with a swinging and adjustable strainer, substantially as and for the purpose herein specified.

77,508.—HARNESS.—Adam McMullen and John H. Rock, Sterling, Ill.

We claim the tugs, B D, brace, C, straps, H and F, and collar, A, when the various parts are connected together and operating in the manner as herein set forth.

77,509.—SAND SCREEN.—Robert McMurray, Brooklyn, N. Y.

I claim the combination with the frame and straight vertical rods, of cross wires, formed with equidistant eyes or loops, through which the vertical rods pass, and by which they are retained laterally, all substantially as and for the purposes described.

77,510.—RAILROAD SWITCH.—Edward Mercier (assignor to himself and Henry W. Bailey), Springfield, Mass.

I claim, 1st, The combination of the fixed guides, f f', with the sliding safety pieces or inclines, a a', substantially in the manner described and for the purpose specified.

2d, The supporting plates, e e', arranged and combined with the fixed guides, f f', and sliding inclines or safety pieces, a a', substantially as described and for the purpose specified.

77,511.—WASH BOILER.—J. C. Merrill, Medina, N. Y.

I claim the boiler, provided with the tube, B, and slides, C, and having the auxiliary tube, D, and grate, F, arranged for use in connection therewith, for the purpose of adapting the boiler to use either with or independent of the stove, substantially as described.

77,512.—DAMPER FOR HOT AIR FURNACES.—Albert H. Merchon, Philadelphia, Pa.

I claim the chain, B, pulleys, D D, door, F, horizontal flue, I, and damper, M, when combined and constructed substantially as and for the purpose herein described.

77,513.—SPRING HORSE.—Henry F. Metzler, New York city.

I claim, 1st, The adjustable foot rest, vibrating with the horse, substantially as described.

2d, The cross bars, j and j', to secure the ends of the spiral spring, and as a means of attaching the same to the screw, i, and bracket, E, substantially as described.

77,514.—LAMP BURNER.—Charles M. Miles and George W. Remsen, Lincoln, Del.

We claim, 1st, The chamber, H, and annular slide, I, having openings, , and outlets, d, when the said outlets, d, are protected by guard, e, all constructed and arranged to operate in the manner and for the purpose set forth.

2d, The combination in a lamp burner of the perforated turret, D, provided with slide, F, dead air chamber, A, perforated chamber, H, and annular slide, i, when said chamber, H, is provided with outlets, d, which are protected by a guard, e, all constructed, arranged, and operating as described for the purpose specified.

3d, The lamp burner constructed as described, and consisting of the cap, E, wick tube, B, perforated turret, D, having slot, b, perforated annular slide, F I, having pins, a, dead air chamber, A, perforated chamber, H f, having outlets, d, guard, e, and ring, G, all constructed and arranged to operate as set forth.

77,515.—TRACE HOOK.—G. L. Miller, Pontiac, Mich.

I claim the herein described trace hook, when constructed in the manner as set forth, as a new article of manufacture.

77,516.—BASKET.—Sarah P. P. Miller, Beaver, Pa.

I claim as a new article of manufacture a cloth basket made of strips of cloth braided or twisted together and coated with varnish or sizing inside and out, to preserve the form and render it water proof, substantially as described.

77,517.—STEAM GLOBE VALVE.—Albert Moore and A. D. Howes, South Adams, Mass.

We claim, 1st, The shell formed of the parts, A A', with the valve chamber, B', substantially as described.

2d, The block, D, and the valves, C C, in combination with the shell and valve stem, B, when arranged substantially as shown and described.

77,518.—MANUFACTURE OF ELASTIC ROLLS.—Joel Moulton, Boston, Mass.

I claim, 1st, As a means of more securely fixing the body of an elastic roll to its shafts, the employment therewith of a metallic wire or string.

2d, The mode herein described of applying the strands of fibrous material to a sheet, or between two sheets, of vulcanized rubber.

77,519.—COAL STOVE.—Edwin A. Parker, Horseheads, N. Y.

I claim, 1st, The arrangement of the annular chamber, E, around the tubular downward extension, C, of the fire box, said chamber communicating with the fire box and with the atmosphere in the room, so that a supply of fresh air entering it may be caused to enter the fire box and also the room, substantially as herein shown and described.

2d, The chamber, H, arranged in the bottom of the stove base, B, and close above the floor, and communicating with the draft chamber, E, as set forth, so that it will serve to distribute fresh warm air around the base of the stove, close above the floor, as specified.

3d, The chambers, E and H, when arranged as set forth, in combination with the chamber, I, through which the products of combustion can be made to pass, so that thereby the fresh air passing through the chambers, E and M, will be warmed, substantially as herein shown and described.

4th, The damper, K, connecting the chambers, E and I, for the purpose of allowing the introduction of fresh air from the draft chamber, E, to the smoke pipe, J, substantially as herein shown and described, for the purpose of checking the draft.

5th, The S-shaped partition, L, in the chamber, I, in combination with the partition, a, horizontal partition, f, pipes, K E, and smoke pipe, J, as herein described, for the purpose specified.

77,520.—RAILROAD CAR TRUCK.—J. R. Perry and D. W Perry, Wilkesbarre, Pa.

We claim the combination of the sliding and pivoted boxes, C D, upon each side of the wheels, friction rollers, e, connecting bar, E, attach d to the axles upon each side of the car, and the oscillating bar, F, as herein described, for the purpose specified.

77,521.—MEASURING AND REGISTERING GRAIN.—Wm. H. Pfrimmer, Lancaville, Ind.

I claim the tilting platform, A, in combination with the scale beam, E, the hooper, B, and the recording apparatus of the dials, the whole constructed, arranged, and operating substantially as and for the purpose herein described.

77,522.—TOOL HOLDER.—Frederick A. Potter, North Providence, assignor to Faies, Jenks & Sons, Smithfield, R. I.

I claim the arrangement of the holder, A, the tool bar, B, and the holding pin, b, with reference to each other substantially as described, for the purposes specified.

77,523.—FIELD ROLLER.—D. R. Prindle, East Bethany, N. Y.

I claim the jointed axis or pivot, a b, for two or more sections, A B, of a roller, substantially as and for the purpose herein specified.

Also, the vertically oblong or upright bearing, d, between the sections of the roller, substantially as set forth.

Also the combination of the jointed axis or pivot, and the vertically slotted or oblong bearing, so as to produce a roller which will adapt itself up and down to the unevenness of the ground, but will be rigid in a horizontal direction, substantially as herein specified.

77,524.—HARVESTER.—Jo. Ramsey, Milford, Texas.

I claim, 1st, The pin wheel, J J, constructed of two light disks, with pins, i i, in their periphery, and with an endless bracing or assaying wire, j, passed diagonally from one disk to the other around the pins, i i, in combination with the device, G h, which drives the sickle of a harvester such as described, all substantially as described.

2d, The guard fingers, g, constructed as shown in figs. 5 and 6, with a narrow, straight slot terminating in an elliptical or circular eye, for the purpose set forth.

77,525.—HARVESTER.—Amos Rank, Salem, Ohio.

I claim in combination with a vibrating lifting lever, K, and its pawl, O the construction of the ratchet plate, J, with spaces, r, between the teeth, p thereof, substantially as described.

77,526.—HARVESTER.—Amos Rank, Salem, Ohio.

I claim, 1st, The combination in a belt tightener of the angular lever, m, spring, l, and the grooved wheel, k, substantially as and for the purpose described.

2d, Applying the inside divider, P, to a bracket, T, upon the reel post, H, and making this divider adjustable, substantially as described.

77,527.—GUIDE GAGE FOR PRINTING PRESSES.—Oliver H. Reed, Washington, D. C.

I claim the use of a folding pin or side guide, for paper upon a printing press, substantially as set forth.

77,528.—KING BOLT FOR CARRIAGES.—John Reiber and John Schrader (assignors to themselves and W. M. Lewis), Bridgeport, Ill.

We claim, 1st, The jointed bolt d, in combination with the clip, B, and head block, d, substantially as and for the purpose shown and described.

2d, The brace, D, having joint, b, in combination with the clip, B, jointed king bolt, d, axle, A, and coupling, E, all substantially as and for the purpose shown and described.

77,529.—BOOT HEEL.—Frederick Richardson, New Bedford, Mass.

I claim the reversible plate, c, formed substantially as described, in combination with the flange, a, and the filling, d, and applied to a boot or shoe heel as set forth and specified.

77,530.—SCREW CUTTING MACHINE.—J. H. Richardson, Chicago, Ill.

I claim the combination of neck, I, face plate, C, cams, m n, pulley, F, friction band, G, collar, H, treadle, y, dies, s, and die head, D E U, the whole being constructed and arranged to operate substantially as herein specified.

77,531.—CARRIAGE STEP SCREEN.—A. Q. Ross, Cleves, Ohio.

I claim the carriage step screen, B, operated by means of bars and spring, or cord and pulleys, or by other equivalent manner, by means of the carriage door, substantially as and for the purposes above set forth.

77,532.—PISTON PACKING.—Frank J. Roth, Schenectady, N. Y. Antedated April 22, 1868.

I claim the side rings, E E, and packing rings, D D, when combined substantially in the manner set forth.

77,533.—PISTON PACKING.—Frank J. Roth, Schenectady, N. Y. Antedated April 22, 1868.

I claim the central ring, c, break joints, , and packing ring, d, when combined substantially in the manner herein set forth and described.

77,534.—STUFFING BOX PACKING.—Frank J. Roth, Schenectady, N. Y. Antedated April 22, 1868.

I claim the employment of cock, g, or its equivalent, when used in connection with stuffing box, a, substantially as herein set forth and described.

77,535.—PLANTER AND CULTIVATOR.—Casper Rubbles, Lowville, N. Y.

I claim, 1st, The V-shaped shares, H, applied to the machine through the medium of the rods or bars, c c, which are connected by joints, d, to the rear bar of the frame, A, and connected at their front ends by chains, I, to wheels or pulleys, F, on shaft, E, substantially as shown and described.

2d, The tubes, K, provided with the slides, g g', attached to the levers, L, which are connecting to the reciprocating rod, M, operated through the medium of the spring, N, and the projections, i, on wheel, O, substantially as set forth.

77,536.—SOAP HOLDER.—Mark Safford, Boston, Mass.

I claim the combination with the soap dish and one or more projections or legs, e e, thereon, of a bolt or clamp, and spring for actuating the same, arranged and operating in connection with the said legs, substantially in the manner and for the purposes shown and set forth.

77,537.—CEMENT.—Charles Saffray, M. D., New York city. Antedated April 25, 1868.

I claim the preparation of oil as above described, for making cements, and an improved cement made of the above named materials, bound together by the chemical action upon them of the oil so prepared, said cement to be applied to the uses specified.

77,538.—PUMP PISTON.—Oliver Salgee, New York city. Antedated April 25, 1868.

I claim the forked link, k, in combination with the ring piston, m, that is formed with sockets, receiving the joints, l, of said link, k, and with the valve, o, applied between the forked link, as and for the purposes set forth.

77,539.—INSTRUMENT FOR TREATING PILES.—H. Schevenell and S. S. Rembert, near Memphis, Tenn.

We claim the electrode, A B, composed of different metals, a a b, substantially as shown and described, for the purposes set forth.

77,540.—CLOTHES PIN.—Ebenezer Seaver, Boston, Mass.

I claim the beveled contact surfaces of the parts, A and B, as shown at fig 2, in combination with the teeth, C C, as and for the purpose specified.

77,541.—DERRICK.—John Sheldon, Chicago, Ill.

I claim the general combination and arrangement of standard, A, arm, D, braces, C and M, with brace, S, substantially as and for the purpose set forth.

77,542.—WATER METER.—Gerard Sickles, Boston, Mass.

I claim, 1st, Effecting the entire motion of the valve by shifting the bearings of the foot of the prop, o, attached to the under side of the valve piston, substantially as set forth.

2d, Extending the prop of the valve piston down into the cylinder, so that it can be operated upon by the direct motion of the cylinder piston.

3d, The combination of the valve piston, k, the movable prop, o, and the connecting bar, d, substantially as and for the purpose described.

77,543.—MOP WRINGER AND BRUSH.—William S. Simpson, Berea, Ohio.

I claim the combination of the frame, A, having arms, g, brush, B, rollers, D F, levers, f, adjustable spring bolt, h i, and mop cloth, J, all constructed and arranged as described, for the purpose specified.

77,544.—PORTABLE FENCE.—H. D. Smalley, New Baltimore, Ohio.

I claim the peculiar arrangement and combination of the panel, A2 D2, with projecting rails, D2, the panels, A D, with projecting rail, D, and the braces, F, with notches, d and e, the several parts being arranged in the manner and for the purpose specified.

77,545.—ADVERTISING FRAME.—Josephus Sonnedecker, Cincinnati, Ohio. Antedated April 29, 1868.

I claim the frame or case, A B, having grooved panels for the reception of advertising cards, and being adapted to be secured to each other and to a lamp or other post, substantially as set forth.

77,546.—POLISHING MACHINE.—John Satckhouse, West Pittsburg, Pa.

I claim, 1st, The guide, H, for introducing the metal to be polished in a line parallel to the axial lines of the rollers, C C', the guides, I I, for holding said metal longitudinally between said rollers, and the guide, m, for receiving the polished metal in the line of its passage from between the rolls, as herein described, for the purpose specified.

2d, The guides, H I and m, in combination with the polishing rolls, C C', and head blocks, A A', substantially as described, for the purpose specified.

77,547.—PLOW.—P. H. Starke, Richmond, Va.

I claim, 1st, The double beams, Nos. 6 and 7, attached to the standard as described, for the saving of power and prevention of choking.

2d, The standard or frame pieces, No. 5, having no vertical connection with the beams, to which the other parts are attached, as described.

3d, The point, No. 4, indented with a succession of points, in place of a share, each of its cutting parts presented nearly square to the front, to prevent the plow from being wedged or pressed so hard against the land as to wear the land side, and cause considerable loss of power thereby.

77,548.—BARBER'S CHAIR.—John Stock and Jacob Stock, New York city.

We claim the movable back, D, hinged to the stationary back, B, of a barber's chair, arranged with suitable mechanism to fix this movable back, D, in any desired position, in the manner and for the purpose substantially as set forth.

77,549.—BASE BURNING STOVE.—David Stuart and Lewis Bridge (assignors to Stuart, Peterson & Co.), Philadelphia, Pa.

We claim, 1st, The chamber, F, between the fire pot and casing, G, when the said chamber has in front openings for the admission of cold air, and communicating at the rear with openings for the passage of another current of cold air, all substantially as and for the purpose herein set forth.

2d, The above in combination with the air chamber, K, at the rear of the fire chamber.

3d, The plates, J and H, between which is a passage forming a communication between the lower crescent-shaped chamber, K, and upper chamber, Q, as described.

4th, The air opening, q, communicating with the space between the plates, J and H, as set forth.

5th, The crescent-shaped air chamber, Q, open in front for the passage of the products of combustion from within the space enclosed by the inner casing of the said chamber round to the rear of the same, as set forth.

6th, Openings for admitting cold air at three different points to the within described chambers or their equivalents, in which the air is heated, and by which the heated air is delivered in one volume to a receiving chamber, T.

7th, The coal reservoir, S, suspended within but at a distance from the chamber, Q, as set forth.

77,550.—MODE OF ATTACHING KNOBS TO SCREWS.—Charles H. Thurston, Marlboro, N. H.

I claim the construction of the attaching screws in a wooden knob, by the formation of a slotted screw and key, causing it to remain in place, substantially as herein shown and described.

77,551.—NEEDLE BOOK.—Joseph F. Umpleby, Albany, N. Y.

I claim, 1st, The needle book, A A', constructed with cushion, K e f, and with gage plate, g, substantially as and for the purpose described.

2d, The gage plate, g h, applied to the needle book, as described.

3d, Providing a needle book constructed as shown and described, with the oil-stone, c, which is arranged to bear against the cushion when the book is closed, as set forth.

77,552.—COMBINED KNOB LATCH AND LOCK—John H. Vickers, Norwich, Conn., assignor to Norwich Lock Company. Antedated April 22, 1868.

I claim the employment of one or more tumblers, M, in combination with the latch lever, D, in the Tyler lock, and adapted to operate relatively to the key, N, and stop, A', or their equivalents, substantially as and for the purpose herein specified.

77,553.—HEMP BRAKE.—Daniel F. Wallace, Ripley, Ohio.

I claim the beating wings, C, in combination with the rest, D, operating in the inclined slots, L, and provided with the springs, E, when arranged substantially as described and shown.

77,554.—ROTARY SCRUBBING MACHINE.—Charles E. Wareham, Port Washington, Wis. Antedated April 25, 1868.

I claim the arrangement of the box, A, mounted on wheels, B B, in combination with the bevel gear, c c', for operating a rotary brush or mop, substantially as and for the purposes herein described.

77,555.—FRUIT JAR.—John Weidig, Philadelphia, Pa., assignor to Wm. W. Lyman, West Meriden, Conn.

I claim the combination of the stopper, B, elevations and depressions, d d, recess, k, rim, c, clamp, e, fulcrum or center, b, packing and seat, b b', notched ring, g, substantially as and for the purpose described.

77,556.—GRAIN RAKE.—Marcus M. Wells, Hartwick, N. Y.

I claim the jointed lever, D, in combination with the curved tines, A, cross bars, C B, connection, G, and handle, E, as described.

77,557.—WINDMILL.—John A. Wheeler, Freeborn, Minn.

I claim, 1st, The false arms, I I, secured by means of adjustable eyebolts, N N, to the band rods, G H, so that the sectional sails, J J, can be pivoted between the radial arms, F F, and the false arms, I I, all arranged substantially as herein shown and described.

2d, The rods, K, eyes, c, and lugs, b, in combination with the sectional sails, J J, false arms, I I, eye bolts, N N, band rods, G H, and radial arms, F, all arranged and operating substantially as herein shown and described.

77,558.—CAR COUPLING.—Nathan Whitten, Etna, Me.

I claim the combined lever, F, bar, F', and sweep, E, secured to the draft bar, B, to the car floor, and to the plunger rod, D, for the purpose of giving a forward rectilinear and increased motion to the plunger, C D, when the draft bar is forced backward, all for the purposes and in the manner as shown and described.

77,559.—FRUIT JAR.—Leonard Worcester and Jos. S. Brown, Lowell, Mass.

We claim the elastic cover, A, and the perforated disk or washer, B, applied to the mouth or opening of a fruit or preserve jar, in the manner and for the purpose substantially as described.

77,560.—TOY SAFE WITH PUZZLE LOCK.—Abram Wright and George F. Wright, Clinton, Mass.

We claim the application of a puzzle lock, when constructed as herein shown and described, or any other mechanical device which will produce the same result, to miniature or toy safes substantially as and for the purpose herein set forth.

77,561.—CHERRY STONER.—Rufus Wright, Brooklyn, N. Y.

I claim, 1st, The intermittingly rotating feed wheel, C, when operated by the lever, B, or other device, which carries the stone ejecting needle, G, substantially as and for the purpose set forth.

2d, The pendent projection or guard, c, attached to the needle bar or lever, B, in connection with the intermittingly rotating feed wheel, C, for the purpose specified.

3d, The yoke or band, K, attached to the hopper, I, in connection with the feed wheel, C, arranged to operate substantially as and for the purpose set forth.

4th, The spiral plate, D, ratchet, E, pawl, F, and lever, B, or its equivalent, for operating the wheel, C, all arranged substantially as and for the purpose, specified.

77,562.—CORN HARVESTER.—Peter C. Yost, Hamilton, Ill.

I claim, 1st, The form and configuration of the knife, C, as applied to a carriage or shed for reaping, substantially as described.

2d, The slotted adjustable beam, B, carrying the knife, C, and hooks, D d, substantially as and for the purposes described.

3d, The apron, E, to catch the corn or grass, as applied to a carriage, or sled for reaping or mowing, substantially as described.

77,563.—CONSTRUCTION OF METER SAFE.—A. W. Adams, New York city,

I claim a safe of cast or wrought metal, provided with an opening, M, arranged as described, and a door or side which when closed becomes permanently locked by means of the devices herein above described, or their equivalents, so that the safe cannot be opened except by violence, the whole being adapted to enclose and protect a meter, as and for the purpose set forth.

77,564.—GATE.—John Adams, Pontiac, Mich.

I claim, 1st, The bar, h, when used in combination with a gate, for the purpose of automatically detaching the teeth of the brace, D, and thereby dropping the front end of said gate, as herein fully set forth.

2d, The combination of the bar, K, provided with a catch or pin, x, with the lever, L, when both are arranged as and for the purpose specified.

3d, The arrangement of the brace, D, catch, g, bars, h and K, lever, L, and a farm gate, the several parts being constructed and operating substantially as and for the purpose set forth.

77,565.—ASPHALT PAVEMENT.—Charles P. Alsing, New York city,

I claim an improved pavement formed of the ingredients and prepared and applied in substantially the proportions and manner herein described and set forth.

77,566.—SPINDLE.—Eugene Atwood, Mansfield, Conn.

I claim the combination with the spindle, A, proper, of the head or cap, B, tube or sleeve, C, and whirr, D, made separate and distinct from each other, and fitted and secured together for joint operation, substantially as shown and described.

77,567.—LAMP CHIMNEY CLEANER.—Loring J. Baker, Machias, assignor to Samuel D. Leavitt, Archibald McNichol and Frank Fowler, Portland, Me.

I claim the tottle joint levers, b b b b, operated by the sliding sleeve, c, upon the rod or shaft, d, substantially as and for the purpose as described.

77,568.—METAL HUB.—Wm. W. Ball, Edinburg, Ind.

I claim the annular flanges, B B, made tapering from the hub to their edges and cast of one piece with the hub, in such a manner as to form springs that are contractible, and made to firmly secure the spokes by the bolts, C, as specified.

77,569.—SLIDE VALVE FOR STEAM ENGINE.—John S. Barden, Providence, R. I., assignor to Union Steam Valve Company, Mass.

I claim, 1st, The arrangement of the valve, B, constructed as described, in respect to the three bearing surfaces, as and for the purpose set forth.

2d, The passages, f, so arranged as to connect and communicate between the recesses, e', and the passages, a a, as and for the purpose described.

77,570.—FRUIT JAR.—T. E. Batterson, Rochester, N. Y.

I claim the combination, with the cover, B, of the wire clamp, C, resting loosely in bearings, c, so as to have a free turning and longitudinally movement, the whole arranged as described, and operating in the manner and for the purpose specified.

77,571.—MACHINE FOR CLEANING FEATHERS.—Henry James Beckwith, Chicopee, Mass.

I claim, 1st, The new combination of the head pieces, H I I, secured on the flange, t t, in connection with the box, A B C D, and the slide valve, r, and the steam pipe, P S S S S, arranged to operate together substantially as described.

2d, The use of the head piece, L M N, combined with the branch tubes, X X, and the "heater," E E, and the waste pipe, O, arranged to operate together substantially as described.

77,572.—GAS GOVERNOR.—Eugene Beggs, San Francisco, Cal.

I claim, 1st, In a gas governor, the metallic or other diaphragm, B, and the levers, G and I, together with the valve, M, the whole constructed and operated substantially as and for the purpose herein described.

2d, The regulating weight, S, moving upon the lever, G, and the sliding rod, T, operating substantially as and for the purpose herein described.

3d, The equalizing lever, c, with the weights, g, for increasing the weights on the diaphragm, and to overcome friction when the valve is opening, substantially as described.

77,573.—COLLAR AND CUFF.—John Blakey, Liverpool, and Howard Busby Fox, Oxton, England, assignors to themselves and James Turner Hall.

We claim a frame or holder, A, of leather, silk, or other similar flexible and durable material, when combined with an enclosed detachable leaf or slip of paper, calico, or other similar delicate material or fabric, C, to form an article of wearing apparel, substantially as herein set forth.

77,574.—FLEXIBLE HARROW.—Chas. D. Blinn, Port Huron, Mich.

I claim 1st, The double links, C, when operated in connection with the bars A, in the position herein described.

2d, The solid link, D, in connection with the above mentioned parts, when constructed and operating substantially as and for the purposes herein set forth.

77,575.—DRAFT AND SHAFT TUG.—Henry Bowers, Albany, N. Y.

I claim 1st, The shaft clasp, B, substantially as shown and described.

2d, The tug, A, substantially as shown, and for the purpose set forth.

3d, The combination of shaft tug, A, with saddle, F, breast collar, G, and shaft, C, substantially as and for the purpose set forth.

77,576.—BOILER FOR HEATING PURPOSES.—John Bradley, (assignor to D. L. Bartlett and Horace W. Robbins) Baltimore, Md.

I claim two or more sectional cast metal water or steam chambers, intersected by transverse air tubes or passages, and enclosing or encompassing a central fire space, in combination with two or more similar chambers, formed without such fire space, when all of said chambers are connected by continuous direct water and steam channels, and intersected by transverse smoke-flues, and are also separated by intermediate air spaces, the whole being arranged and made to operate substantially in the manner and for the purpose herein, set forth.

Also the formation and arrangement of continuous smoke and hot-air flues in and through a sectional heating boiler and radiator, by means of tubular openings in the several sections, fitting and connecting with each other, substantially in the manner and for the purpose herein set forth.

77,577.—PRINTING PRESS.—Wm. Braidwood, Mount Vernon, N. Y.

I claim 1st, The arrangement and combination, with the card drop, P, of the cam, U, lever, S, and weighted arm, R, substantially as described.

2d, The supplementary roller, E, lying on roller, D, and so arranged therewith that their peripheries on the side towards the roller frame, F, are in the same vertically moving roller-frame, F, substantially as described and shown.

77,578.—BARREL SIFTER.—Chas. Breasted, Chicago, Ill.

I claim an ash sifter or screener, consisting of the box, A, provided with the concave inclined slide, C, and laterally moving frame, D, having the inclined screen, E, and mouth, b, attached, and protected by the cover, c, all constructed and arranged to operate substantially as herein described.

77,579.—WATCH CASE SPRING.—E. H. Buckland, Springfield, Mass.

I claim 1st, The spring, A, formed of one piece, and reaching over half the circumference of the case and forming both catch and throw-up at each end respectively, substantially as and for the purpose shown.

2d, The stud, E, with the catch, d, formed upon it substantially as and for the purpose shown.

77,580.—SPRING FOR WATCH CASE.—E. H. Buckland, Springfield, Mass.

I claim the independent catch, D, formed upon the strip, C, in combination with the spring, B, and push-pin, A, substantially as herein described.

77,581.—OVEN.—Esek Bussey, Troy, N. Y.

I claim 1st, In combination with an oven attached to stoves, hinging or pivoting therein a division or rack plate, K, so that it may, when not used, be folded therein close to the oven side, in manner substantially as and for the purpose set forth.

2d, In combination with a stove, a drum oven, having a slotted or open back or side, and arranged or placed directly beside and against the exterior wall or shell of the combustion or fire-chamber of said stove, in manner substantially as and for the purpose herein set forth.

3d, In combination with a drum-oven, having an open back or side, and placed against the shell or plate of a stove, the employment therein of a series of slats or plates, L L, arranged in manner substantially as and for the purposes herein described.

77,582.—BURGLAR TRAP.—Wm. Carr, Yellow Springs, Ohio.

I claim 1st, A burglar trap, consisting of a chamber, A, trap door or doors, C C', rods, L L', and suspended platform, K, the whole being arranged to operate substantially as herein described and set forth.

2d, The combination and arrangement, substantially as described, of the chambers, A a a', partitions, B B', trap doors, C C', platform, K, and rods L, L', together with the shafts, D D', and their accessories, E E', e e', F F', I I', G G', H H', I I', and J J', for the object explained.

77,583.—BISCUIT CUTTER.—S. E. Clapp, Cambridge, Mass. assignor to himself and J. J. Ridgeway.

I claim as a new article of manufacture, the biscuit cutter, either with or without the center piece, D D' D'' substantially as described and for the purpose set forth,

77,584.—REGISTER FOR STEAM ENGINE.—Geo. P. Clarke, N. York and Marmont B. Edson, Brooklyn, N. Y.

We claim 1st, The semi-circular recess, G, in combination with the pins, H H, and roller, F, substantially as and for the purpose set forth.

2d, The construction and application of the spring pad, P Q, in combination with the recess, G, pins, H H, and roller, F, substantially as described.

3d, The construction and application of the movable journal box, L, for the purpose set forth.

4th, The application of square piston rod, W, in combination with the pencil holder, for the purpose herein shown and described.

5th, The application of the hour wheel, 12, in combination with the crooked lever, I, substantially as herein described and set forth.

6th, The productions of the delineations on the charts, O, fig. 10, by the combined action of the motion of the engine, and the direct pressure of the steam from the boiler, and the action of the clock movement, the conjoint action of these several agencies producing the desired result, substantially as and for the purpose set forth.

77,585.—SKEIN AND BOX FOR AXLES.—Greville E. Clarke, Racine, Wis.

I claim the skein, B, having a recess on its under part filled with box metal C, and provided with a groove, x, and tongue, and used in combination with the box, D, as constructed, and the rod, E, connected through the axle, as specified, all constructed and used substantially as set forth.

77,586.—WASTE GATE.—Joshua R. Clarke, Cohoes, N. Y.

I claim the water gate, B, constructed substantially as described, in combination with and connected to a follower or piston, M, moving in an open cylinder or well, C, substantially as shown.

77,587.—BAG FASTENER.—Levi H. Colborn, Chicago, Ill.

I claim the combination of the tie chain, A, of the lock plate, B, having a hole, D, and notch, E, with cross notch, E', all constructed substantially as and for the purpose herein set forth.

77,588.—WATER WHEEL.—James P. Collins, Troy, N. Y.

I claim a water wheel in whole or in part coated or enameled with a silicious or vitreous substance, when having a surface or surfaces of cast metal, so as to prevent oxidation and to reduce and lessen the friction of the water upon such parts or surfaces of such water wheel, as and while the water is passing into and through such wheel, so as to give it rotating motion, for the purposes and in the manner substantially as herein contained, set forth, and described.

77,589.—PORTABLE FENCE.—Wm. F. Converse, Harrison, O.

I claim, 1st, The headed wedge-form key, D, constructed and applied, substantially as and for the purpose set forth.

2d, The paired hooks, B B', in the described combination with two contiguous pannels.

77,590.—STEERING APPARATUS.—Wm. H. Conway, Harrison, assignor to himself and H. J. Butler, Baltimore, Md.

I claim a side rudder for steamboats when hinged to the under side of the guards in such a manner that when not in use it can be drawn up out of the water, substantially as and for the purpose set forth.

77,591.—COLLECTING GOLD, SILVER, AND OTHER METALS FROM THEIR ORES.—John Corson, Washington City, D. C.

I claim, 1st, The mode herein described of collecting gold, silver, and copper from their ores, by the action of independent currents of electricity, in crystallizing the metals in an insulated pan.

2d, The amalgamating process, with mercury or any other suitable substance, in an insulated pan or barrel, or other amalgamator.

3d, The mode herein described of forming and applying the battery in the pan, or any other substantially equivalent.

4th, The mode of amalgamation of gold and silver with mercury in an insulated vessel, pan, barrel, or any other, substantially equivalent.

5th, The stationary battery in the cisterns, in the form described, or any other substantially equivalent.

6th, Using for the purposes herein named the aforesaid machinery and appliances, or any other substantially the same, in which the same principle is used or involved.

77,592.—FURNACE AND CONDENSER FOR COLLECTING QUICKSILVER.—Joseph C. Coult, San Francisco, Cal.

I claim, 1st, The arrangement of the panes, d' d' d', in the ore chambers, C C, instead of the vapor chamber, D.

2d, The arrangement of the grating, d d, placed on the inside of the ore chambers, C C, to be used with or without the water linings, f f, as may be desired, as and for the purposes set forth.

3d, The arrangement of making or lining the inside of the condensing opening or pipes, H H H, with copper, silver, or other material that can be coated with quicksilver, as and for the purposes set forth.

4th, The arrangement of placing in any part of the condensing openings, H H H, leading from the furnace to the final escape into the open air, a series of punched copper, silver, or plate made of other material, that will or can be coated with quicksilver, for the purpose of amalgamating the fumes of mercury thereto, and saving all that would otherwise escape, as and for the purposes set forth.

77,593.—REGISTER FOR RAILROAD FARE.—Samuel F. Covington, Cincinnati, Ohio.

I claim, 1st, In combination with the seat of a railroad car, a box, so constructed that it may receive check plates, showing the names of the station to and from which the passenger has paid his fare, and so arranged that the plates can only be withdrawn by unlocking the box, substantially as and for the purpose set forth.

2d, The combination of the box, B, false bottom, D, glass plate, F, pins, G, and check plates, H, substantially as set forth.

3d, In combination with the arm, A, and box, B, the lock plate, C, arranged to operate substantially as and for the purpose set forth.

77,594.—SPITTOON.—Frank E. Darrow (assignor to the Darrow Manufacturing Company), Bristol, Conn.

I claim the use or employment of raw hide in the manufacture of spittoons.

77,595.—WATER WHEEL.—Nathan Dewey and Geo. W. Fosdick, Dowagiac, Mich.

We claim the wheel, A, composed of the rims, B C, and their buckets D and G, the buckets, D, being curved and inclined from the upper portion of the inner rim to the lower portion of the outer rim, all constructed and operating substantially as specified.

77,596.—WOOD TURNING LATHE.—David Dick, Corning, N. Y.

I claim, 1st, The weighted lever, D, provided with the slotted arm, F, in which the end of the lever, G, works, said lever adapted to operate the curved arm, H, as herein described, whereby the tool heads and spindle are operated simultaneously, as and for the purpose specified.

2d, The weighted lever, I, attached to the rock shaft, C, and provided with the segment arm, K, fitting in the spindle, B, all operating as described, for the purpose specified.

77,597.—ROCK DRILLING MACHINE.—Frederick B. Dœring, London, England. Patented in England Jan. 7, 1867.

I claim, 1st, The combination of the following elements or parts, viz: first an ordinary cylinder provided with a piston and piston rod, suitable for supporting a boring tool; second, a distributing cylinder, provided with ports and pistons, actuated from the rod of the ordinary cylinder, the combination being substantially as described.

2d, The combination of the following elements or parts, viz; first, an ordinary cylinder provided with a piston and rod suitable for supporting a boring tool; second, a distributing cylinder provided with ports and pistons, actuated from the rod of the ordinary cylinder; third, a cylinder actuating a pawl, the combination being substantially as set forth.

3d, The combination of the following elements or parts, viz: first, an ordinary cylinder, provided with a piston and piston rod suitable for supporting a boring tool; second, a distributing cylinder provided with ports and pistons, actuated from the rod of the ordinary cylinder; third, a cylinder actuating a pawl, the combination being substantially as set forth.

4th, The combination of these elements or parts, viz: first, an ordinary cylinder provided with a piston and rod suitable for supporting a boring tool; second, a distributing cylinder provided with ports and pistons, actuated from the rod of the ordinary cylinder; third, two cylinders actuating each a pawl, the one to revolve the tool, the other to advance the boring tool towards its work, the combination being substantially as described.

77,598.—CLOTHES PIN.—Wm. M. Doty, New York city.

I claim, 1st, A clothes pin composed of a stock, hook, and spring, combined as herein specified, the hook having a play at right angles, or transverse to the stock, in the manner described.

2d, The arrangement of the hook and stock so that the former shall pass through the body of the stock or be supported upon the exterior of the same, as and for the purpose herein set forth.

77,599.—STRAW CUTTER.—Geo. A. Edwards, Centralia, Ill.

I claim the arrangement of the pivoted box, B, upon the coil spring, h, and its shaft, K, having the rakes, r r, that are operated by the lever, l, and cord, m, and used in combination with the sliding head, F, inclined knife, L, and the angular knife, C, on the frame, A, all constructed and used as specified.

77,600.—FRUIT PARER.—Levi D. Farwell, Lancaster, and Artemus W. Goddard, Clinton, Mass. Antedated April 25, 1868.

We claim the slide, a, the lever, h, and the foot, g, with cam, c, or any other mechanical device, substantially as and for the purpose specified.

77,601.—CHURN.—John E. Finley, Memphis, Tenn.

I claim the combination of the flanged wheels, H H, thimble, G, key, I, tube, E, rod, d, frame, J, drive wheel, A, and cog wheels, B C, arranged and operated substantially as described.

77,602.—RAILROAD TRACK CLEANER.—George P. Floyd, Quincy, Mass.

I claim the nozzles, K, attached to the pipes, D, when constructed and operating substantially as and for the purpose set forth.

77,603.—WINDOW SAFETY GUARD.—John F. Ford, Boston, Mass. Antedated April 28, 1868.

I claim as my invention the window guard as composed of the bars, A B C D, arranged and connected by screws and having spurs, substantially as described.

Also the combination and arrangement of the springs, d d, in the sockets of the middle projections of the bars, A B, with such bars and their spurs, and the bars, C D, applied to the bars, A B, substantially as specified.

77,604.—NAIL MACHINE.—Roya! C. Grant, Middleport, Ohio.

I claim, 1st, The horizontally rotating cylinder, B, provided with a series of cutters and headers, in combination with clamp, h, all constructed and arranged to operate substantially as described.

2d, In combination with a series of cutters, a, arranged as described, the laterally reciprocating plate holder, g, arranged in such relation to the rotating cylinder as to present the nail plate alternately to the two circles of cutters, as set forth.

3d, The combination of the clamp, h, and the sliding rest, d, with the headers, r and w, when arranged to operate substantially as described.

77,605.—CLOTHES LINE HOOK.—Elijah H. Gray, Winchester, Ill.

I claim the hook, A, provided with jaws, b b, in combination with cam lever, d, spring, g, and pulley, C, all arranged substantially as set forth.

77,606.—SAWING MACHINE.—J. P. Grosvenor, Lowell, Mass.

I claim, 1st, The frame, A, carrying the saw arbor, S, sliding in the inclined guide frame, B, shaft, C, screw, x, and bevel gear, C C, all constructed and arranged to operate in the manner substantially as described.

2d, The employment of the connecting rod, a, combined with the rocking rest, b, and the tail, g, thereof, constructed and operating in the manner and for the purposes substantially as described.

3d, The reversible rest, h, combined with the pivoted bar, k, projection, n, notch, e, slide table, D, spring, m, or its equivalent, all constructed and operating substantially as described.

77,607.—SHOEMAKER'S BENCH.—John A. Hahn and Charles Volker, Degraff, Ohio.

I claim, 1st, The clamp, C, when constructed with the vertically adjustable jaw, c, the vertically and laterally movable jaw, c', the spring, s, and the combination of the cam lever, D, rod, E, and treadle, F, for the purpose of operating it, the whole being constructed, arranged and operating in the manner described.

2d, The combination and arrangement on a shoemaker's bench of the clamp C, constructed and operating as above described, and the apparatus consisting of the plate, I, blocks, M and N, screw, O, strap, r, and treadle, T, all constructed and operating in the manner and for the purposes set forth.

77,608.—REIN SHACKLE.—Joseph Hale, Somerville, and Wm. Hall, Brookline, Mass.

We claim as a new article of manufacture a rein shackle made substantially as described, as and for the purposes set forth.

77,609.—WATER WHEEL.—Alonzo J. Hall, Derry, N. H.

I claim, 1st, The apertures, e, and circular groove in flange, O, in combination with the chambers, C, and hub of the outer wheel, B, when arranged to operate in the manner and for the purpose specified.

2d, The valve, V, in combination with the weight, W, and gate, T, substantially as and for the purpose specified.

77,610.—FLOOR CLAMP.—Edgar A. Hall, Sugar Branch, Ind.

I claim the arrangement of dog, A B B' s, eccentric cam, C, and reversible lever, E e e', substantially as set forth.

77,611.—SEAMING MACHINE.—Walter Haslem, New Britain, Conn.

I claim the combination with the brackets, e, and stop, g, of the slotted plate, d, provided with its loop holding points, and a thumbscrew for the ready tightening and releasing of the plate, substantially as and for the purpose set forth.

77,612.—VAPOR BURNER.—Samuel B. Hopkins and Edward H. Anderson, Easton, assignors to themselves and J. M. Satterfield, Baltimore, Md.

I claim the burner above described, having the central cone, A, pierced with four holes, a a a' a', at the points specified, when used in combination with a plate, B, bent up at the ends, and having ears, c c, projecting upward from its side, substantially as and for the purpose described.

77,613.—MILEAGE REGISTER.—Benjamin Horn, Sergeantsville, N. J.

I claim, 1st, The spring crank or pin, B1, carried on the hub, B, and adapted to set on the wheel, D, so as to yield when necessary, and avoid fracture, substantially as and for the purpose herein specified.

2d, The ringing mechanism, F G, arranged to operate in combination with mechanism for receiving motion from the wheel of a carriage, and thus indicating to the ear each mile or other unit of distance travelled, substantially as and for the purpose herein specified.

3d, In combination with mechanism, substantially as herein described, for receiving motion from the rotation of the wheel of a carriage, the striker, R, operated by such mechanism at uniform distances traveled, and arranged to mark on a surface uniformly traversed across its path, substantially as and for the purpose herein specified.

4th, In a mileage register having provision for striking a bell, or marking on a moving surface by a blow, as described, so forming and arranging the elastic parts, P R, or either of them, that while allowing for a reasonable amount of backing without derangement, fraudulent turning of the carriage wheel backward will break or permanently set one or both of the striking parts, substantially as and for the purpose herein specified.

77,614.—LAMP BURNER.—Wm. H. Horton, Providence, R. I.

I claim the chimney supporter, D, consisting of the ring with its studs, g, and perforations or air holes, arranged as specified.

Also, the combination as well as the arrangement of the guard, E, the per-

forated annuli, C and F, and the flange, k, with the body, A, and wick tube of the burner.

77,615.—FRAME FOR STRETCHING HIDES AND LEATHER.—Theodore P. Howell and Charles P. Oliver, Newark, N. J.

We claim the arms, A and B, constructed, combined and operating substantially as and for the purposes specified.

77,616.—PLOW COLTER.—Horace S. Hoxie, Adrian, Mich.

I claim, 1st, In combination with the coulter, A, the braces, a, b and D, mold board, B, tenon h, all constructed in the manner set forth and described.

2d, The combination of the mold board, B, and coulter, A, when both are made in one piece, or welded together in the manner set forth and described.

77,617.—SULKY PLOW.—Leavitt Hunt, Weathersfield, Vt.

I claim, 1st, The hinged beam, D, and the plow beam, E, provided with and connected by the oval axle, e, and the chain, or its equivalent, substantially as described and set forth.

2d, The combination of the iron lever, l, with the bar, k, and the beam, D, substantially as and for the purposes set forth.

3d, Providing the beam, E, and the hole, C, with the slots, S and d, to act in conjunction, thereby giving the plow some longitudinal play, when the beam, E, is connected to the whiffletree or bolt, i, by the chain, F, or its equivalent, substantially as described and for the purposes specified.

77,618.—MANUFACTURE OF ZINC.—A.G. Hunter, Flint, Wales.

I claim the process of extracting zinc from its ores by the direct application of heat to the said ores without the use of crucibles or retorts to contain the said ores, the heated gases and flame being, previously to their contact with the zinc, carefully deprived of free oxygen, and the subsequent condensation of the zinc vapor to the metallic state, all substantially as herein described.

77,619.—LOOM.—W. H. Jackson, Brooklyn, N. Y., and Geo. Merrill, Newburyport, Mass., assignors to Merrimac Loom Company, Boston, Mass.

I claim, 1st, The mechanism substantially as described, for operating a weft carrying needle, so that its point shall pass through the wider part of the shed and return near the point of weaving, substantially as and for the purpose set forth.

2d, A loom having a weft carrying needle, arranged and operated substantially as described, so as to pass its eye through the shed obliquely, or near the beater, when the latter is thrown back, then around a stationary bobbin located at the opposite edge of the shed, and thence back through the shed to the place of starting, substantially as set forth.

3d, The combination of the shuttle holder, y, the reciprocating fingers, 21 and 22, bobbin, x, and the weft carrying needle, when said parts are constructed and arranged for joint operation with the mechanism of a loom, substantially as herein described.

77,620.—LAMP BURNER.—Melvin Jincks, Dansville, N. Y.

I claim, 1st, The sliding springs or holders, b b, for the purpose of adjusting the same to different sizes of chimneys, substantially as described.

2d, In combination with the above, the burner, A, cone, B spring clips, c c, and flange or knob, h, when all are constructed and arranged substantially in the manner and for the purpose set forth.

77,621.—COMBINED TWEEZERS, WATCH KEY, ETC.—David A. Jones, Springfield, Mass. Antedated April 22, 1868.

I claim the combination of the tweezers, A A', ear spoon, f, and watch key, g, arranged and constructed substantially as and for the purpose shown.

77,622.—ANIMAL TRAP.—P. W. King, Lowville, N. Y.

I claim the combination of the members, C, E, F, G, H and S, for the purposes intended.

77,623.—PERMUTATION LOCK.—Jacob Klein, Williamsburgh, N. Y.

I claim, 1st, The oscillating hinged ward, e e, as constructed, in combination with the catch or arm, d, operating with the disk, E F, and bolt, D, by means of the acute angle lugs, f f, on the shaft of the knob, B, substantially as herein described.

2d, The double acting spring, P P, the brake keys, q q, operating reversely against the ring plate, M, for holding it in position, when set to a given number, as set forth.

77,624.—COOLER AND REFRIGERATOR.—August Koch, Baltimore, Md.

I claim the combination of a detachable seive or perforated ice pan, I, with the upper part of a ventilated water cooler, A, and with a ventilated refrigerating box or vessel, E, placed centrally therein beneath said pan, and surrounded by a water space, F, all substantially as and for the purpose herein set forth.

77,625.—HAME.—E. F. Lacy and D. K. Woodbury, Danville, Ill.

We claim the adjustable metallic plate, C, provided with L-shaped ears, x x, which project beyond and under the stationary plate, B, and work in vertical grooves in the wooden hames, A, all constructed, arranged and operating as set forth.

77,626.—SHAFT COUPLING.—James Lamb, Aurora, Ind.

I claim the movable taper, d, and movable socket, e, secured between the arms, C C, and used in combination with the straight bolt, E, thill, F, and clips, B B, substantially as set forth.

77,627.—SELF-SEALING BURIAL CASE.—Peter F. Lawshe, Rochester, Minn.

I claim, 1st, A self-sealing burial case, constructed and arranged to operate substantially as described.

2d, A metallic burial case, constructed substantially as herein described, and provided with the rubber packing, as and for the purpose set forth.

77,628.—FISHING TACKLE.—Llewellyn D. Lothrop, Dover, N.H.

I claim the swivel, as made with the eye, c, and slot, d, arranged in it, substantially as and for the purpose hereinbefore specified.

77,629.—HOISTING AND TRANSFERING PULLEY.—Almon D. Manley (assignor to himself and Lewis H. Cantine), Washington, Mich.

I claim the arrangement of the block, B, drum, K, pulley, R, and lever, L, in combination with the car, D, and its pulleys, levers, N and I, sliding bar, g, pulley, F, and cords, E C F, adjustable collar, H, and weight, w, the various parts being constructed and operating substantially as set forth.

77,630.—SIDE-HILL PLOW.—D. A. Manuel, Napa City, Cal.

I claim, 1st, Dividing the plow between the share and mold board, F and J, and hinging the two parts to the land side and standards, so that by swinging them to the right or left, and joining the two said parts, they will form a perfect plow, substantially as described.

2d, Construction of the land side, A, wider in front than at the heel, so that the line of draft will incline toward the land, substantially as described.

77,631.—RAT TRAP.—Wm. C. Marquis, Burgettstown, Pa.

I claim the tilting platform, F, when hung on a bent rod, g, in combination with the pendulous weight, h, and spout, C, the several parts being constructed and used as and for the purpose specified.

77,632.—KNIFE AND FORK SCOURER.—D. S. Marvin, Watertown, N. Y.

I claim the combination of the adjustable slat, C, with the bars, A and B, rods and coil springs, b b, as and for the purposes set forth.

77,633.—SAFETY DOOR KEY GUARD.—W. K. Marvin, New York city.

I claim the combination of the plate, A, with a slide or tongue, mounted in or upon said plate, and a spring to hold said tongue in position, substantially in the manner described, the whole constituting a key fastening device, hinged to the door or other part where the key is located, so as to operate in connection with the said key, substantially as and for the purposes shown and specified.

77,634.—MOWING MACHINE.—Nathan F. Mathewson, Barrington, R. I.

I claim, 1st, The spring pawl, 3, when combined and arranged with the pedal, 5, the spring trap, 6, the wedge key, 4, and ratchet wheel, 1, substantially as described and for the purposes specified.

2d, The curved elongation of the shoe, m, in combination with the strap, o, for the purpose specified.

3d, The rods, S S, when used in connection with the wheel, x, the rods, W, the chucks, u, and the gears, E, for the purpose specified.

4th, The double wedge key, P, when performing the double office of journal box and key.

77,635.—GAS HEATER.—S. T. McDougall, Brooklyn, N. Y.

I claim, 1st, The ironing apparatus constructed and operating substantially as shown, in combination with the case or cabinet, A.

2d, The auxiliary chamber, B, combined with the ovens, Q and S, when the same shall be constructed and combined substantially as shown for the purposes set forth.

3d, The air-supply pipe, O, in combination with the downward burner, I, constructed and operating substantially as and for the purposes specified.

77,636.—APPARATUS FOR DISTILLING PINE WOOD.—Dustin F. Mellen, Manchester, N. H.

I claim, 1st., In combination with the cylindrical retort, A, and the furnaces, B, the segmental flues, b and b1, with the upper and lower main flues, B2 and B3, constructed and arranged substantially as and for the purpose set forth.

2d, In combination with a retort for the destructive distillation of resinous wood, the pitch-basin, C, with water space under the same for conveying a current of cold water to modify the heat of the pitch-basin, substantially as described.

3d, In combination with the cylindrical retort, A, and wood-holding perforated cylinders, A', or their equivalents, the pitch-basins, C, located within the main cylinder, A, substantially as described.

4th, In combination with the retort, A, a water pipe or pipes, so arranged as to convey a current of water into and through said retort, to prevent the pitch from being vaporized therein.

5th, In combination with the retort, A, and pitch-tank, C', or their equivalents, a cock or gate, or the equivalent thereof between the retort and the pitch-tank, for the purpose of closing the connection between them while the wood is being charred, substantially as and for the purpose set forth.

6th, In combination with the still and furnace, the angular fire-chamber, j', the annular flue, L', with connecting flues, l, constructed and arranged substantially as and for the purpose set forth.

7th, In combination with the annular fire chamber, j', the fire flues or tubes, L, passing from the furnace, through the still, to said annular fire chamber, substantially as described.

8th, In combination with the rotating agitator, the cog wheel, g, and pinion, g', or equivalent gearing, enclosed in the cylinder, F, substantially as and for the purpose described.

77,637.—BOLT CUTTER.—Frank Miller, Indianola, Ill.

I claim the tool herein described, when its several parts are constructed and arranged substantially as and for the purposes set forth.

77,638.—WINDOW CURTAIN FIXTURE.—G. L. Miller, De Witt, N. Y.

I claim the guide rods, g, and swivels, f, in combination with the vertically adjustable roller, A, as and for the purpose set forth.

77,639.—MOP WRINGER.—Wm. R. Mills, Hartford, Mich.

I claim the combination of the sleeve, B, the crank and shaft, C, the bevel gear wheels, D and E, the hangers, G, the head, J, when arranged with the mop handle, A, the head, I, and the web, H, when constructed and operating substantially as and for the purpose herein described.

77,640.—EXTENSION LADDER.—Jas. F. Morse, Montgomery, Ill.

I claim, in combination with the members, A B, of the ladder, the arrangement of the pulleys, E, cords, m m, shaft, D, and gearing, F G, whereby the operator can raise and lower the upper member of the ladder when standing upon the same, substantially as specified and shown.

77,641.—HAY RAKER AND LOADER.—Sam'l K. Morse, Commerce, Mich.

I claim the slotted semi-circular plates, H H, and curved standards, f f, by means of which the belt frame is adjusted to any desired elevation, as described.

77,642.—RAILWAY CATTLE GUARD.—Peter Mougey, Marshallville, Ohio.

I claim the peculiar arrangement and combination of the platforms, D D D, rock shaft, F, with the arms, H H and I, connecting rod, J, arm, K, and gate L N, the several parts being arranged substantially in the manner and for the purpose herein specified.

77,643.—BLANKS FOR BODIES OF SHEET-METAL TEA AND COFFEE-POTS.—Wm. A. Munn, Milwaukee, Wis.

I claim, as a new article of manufacture, tin-blanks to form the bodies of tea and coffee pots and similar articles, when stamped or pressed with fancy and ornamental designs, substantially as herein described.

77,644.—SCRAPER.—D. B. Nelson, and Morgan Dyer, Elmira, N. Y.

We claim the combination of the bowl, A, movable point, B, beam, C, braces, c c, and lever, E, all arranged and operated as and for the purpose specified.

77,645.—HAME.—Daniel M. Nixon, Danville, Ill.

I claim constructing hames with a staple, D, and sliding plate, F, having opposite projections, E E', said parts being arranged to adjustably attach the trace, substantially as described.

77,646.—MACHINE FOR GRINDING FILE BLANKS.—Edward Norton, Boston, Mass.

I claim 1st, The employment of a pendulous or oscillating hanger or stand in combination with the axis of a grinding stone, arranged parallel to its own axis of oscillation, or equivalent device, substantially as described.

2d, The arrangement of the oscillating grindstone stand or hanger, with an inclination from its supporting and oscillating axis toward the work to be ground, so that the weight of the stone and hanger may be employed to effect all movements of the stone in the opposite direction, substantially as shown.

3d, In combination with inclined arrangement of frame for moving the stone in one direction, the arrangement of a weight, c, or spring to move it in the opposite direction, substantially as set forth.

4th, The frame, l, or its equivalent, operating substantially as and for the purposes set forth.

5th, The employment of the adjustable connecting rod, l, in combination with the crank, m, and carriage, k, and operating substantially as and for the purpose set forth.

77,647.—MACHINE FOR CASTING EYELETS.—Jas. M. Osgood, Somerville, Mass.

I claim 1st, Making eyelets from cast metal, by the means substantially as described.

2d, The fixed pins or rods, d, in combination with the sliding tubes, f, as and for the purpose set forth.

3d, The combination of the fixed pins or rods, d, the sliding tubes, f, and the cylinder, B, as described.

4th, The combination of the cross bars, e, the sliding tubes, f, and the cam plates or disks, C C' as and for the purpose specified.

5th, The cylinder, G, provided with the projections, y, as and for the purpose set forth.

6th, The chamber, i, formed in the plate, H, in combination with the cylinder, B, as described.

7th, A cast-metal eyelet, constructed by the means substantially as above described.

77,648.—BAG HOLDER.—John H. Park, White House, N. J. Antedated April 24, 1868.

I claim the metallic levers, D D, pivoted as described, and forming a hoop at the forward end, when provided with rack bar, e, and used in connection with the block, B, with its spring, a a, all constructed and operating in the manner and for the purposes set forth.

77,649.—COFFEE MILL.—Chas. Parker, and Edmund Parker, (Assignors to Chas. Parker) Meriden, Conn.

We claim 1st, Attaching the stationary grinding bed, a, on to the top board b, by means of lugs, e, in combination with the rim, d, or a part thereof, the lugs entering above and the rim below the top, b, or vice versa, substantially as set forth.

2d, Forming a cracker within the hopper, by extending the side pieces or supports, g, up into the hopper, and so as to form open spaces directly from and within the hopper to the runner, between the said supports, g, and when the said supports are inclined to the runner as described, and the under and inside of the supports, g, provided with teeth, so as to operate in the manner specified.

77,650.—REVERSIBLE KNOB LATCH.—J. E. Parker, Meriden, Conn.

I claim hinging the face plate to the lock case, so as to be turned therefrom, substantially in the manner and for the purpose herein set forth and described.

77,651.—DOOR FASTENER.—G. F. Perkins, and S. F. Gibbs, Holyoke, Mass. Antedated, April 28, 1868.

We claim a combined adjustable door fastener and match safe, consisting of the case, B, cover, A, and bar, C, the whole constructed and operating substantially as described.

77,652.—GAGE FOR WEATHER BOARDING.—Hiram Preston, Orfordville, Wis.

I claim 1st, The plate, B, and screw, i, as also the spring, h, in combination with the bar, A, substantially as described, and for the purposes set forth.

2d, The scribe, D, with the slotted arm, m, and pin, p, constructed to operate in connection with the bar, A, substantially as and for the purposes set forth.

77,653.—CHANNELLING TOOL.—G. W. Pruyne, Mexico, N. Y.

I claim the slide, B, so constructed as to serve the double purpose of holding the knife and forming a shoulder or guide for the tool, in connection with the part, A, substantially as described and set forth.

The handle, C, forming a set screw, and acting in combination with the part, A, and slide, B, substantially as described, and for the purposes specified.

77,654.—ELEVATING FLOUR, FEED, GRAIN, &C.—James Haney, Newcastle, Pa., assignor to himself, Leander Raney, and Bostic Raney.

I claim the arrangement of the fan, F, spout, G, and chamber, H, with the spouts, I, K, and D, as and for the purposes herein set forth.

77,655.—FALL LEAF TABLE.—J. S. Rankin, Detroit, Mich.

I claim 1st, The slides, C, in connection with the screws, D, the plates, H, the slots, G, and the hinges F, and the spiral springs, N, when operating substantially as and for the purposes described.

2d, The combination of the above named parts with the arm, I, hinge, J, guide, K, pin, L, spring, M, leaf, A, top, B, and side rail, E, when arranged and operating substantially as and for the purposes herein set forth.

77,656.—WAGON SKEIN.—C. F. Ravn, Milwaukee, Wis.

I claim skein, B, center iron, D, bolt, E, linchpin, F, nut, G, and cap, H, in combination, substantially as and for the purpose described.

77,657.—ANIMAL TRAP.—Jas. H. Reisinger, Vinton, Ohio.

I claim the trap, A, having the pivoted platform, B, of shape described, doors, C C, blocks, D, rods, d', bait hook, E, arranged as described, passageway, G, gates, I I', and rod, J, the whole being constructed and operated substantially as described.

77,658.—FARM GATE.—Christian Rich, Marshallsville, Ohio.

I claim the peculiar arrangement and combination of the gate, G I H, gate-post, B, gate latch, K, wheel, R, latch plate, D, sliding bar, E, rack and pinion M N, levers, F F, and lever posts, A A, the several parts being arranged and combined in the manner and for the purposes specified.

77,659.—FAGGOT FOR RAILROAD RAILS.—Harrison Rowe, Marietta, Pa.

I claim the manner of making and applying my wider top and bottom plates, A E, in combination with the intermediate filling, B C D, when made into a pile or faggot for being rolled into rails for railroads, substantially in the manner specified.

77,660.—CORN HARVESTER.—David Sarver and Rob't Coons, Greensbutgh, Pa.

We claim 1st, A cut-off, N, having an endwise movement parallel to the path of the machine, substantially as set forth.

2d, The combination, substantially as set forth, with a tilting platform, of a cut-off, vibrating endwise at a right angle to the axis of the platform, and parallel to the path of the machine.

3d, The combination, substantially as set forth, with a tilting platform and a cut-off, of a guide or deflector, supported at the grain end only.

4th, The combination and arrangement, as set forth, with the reel revolving on a vertical axis, of the tilting platform.

5th, The combination, substantially as set forth, of a laterally projecting cutting apparatus, a reel, revolving on a vertical axis, a guide, a cut-off, and a tilting platform.

6th, The combination, substantially as set forth, of the main frame and supplementary frame with the roller arm, F, and bracket, F', for the purposes set forth.

77,661.—REED ORGAN BELLOWS.—John Schatz, New Haven, Conn.

I claim the arrangement of the two chambers, I and K, or either of them, upon one side of a fixed partition, B, in combination with the chamber, H, and bellows, F and G, upon the other side of the said partition, and all of the said partitions connecting with the passage, A, and constructed so as to operate together, in the manner and for the purpose herein set forth.

77,662.—TREE BOX.—Stephen Scotton, Richmond, Ind.

I claim a band or belt, constructed of the various sections, A B and C, formed substantially as described, and for the purpose set forth.

2d, The braces, E, in combination with the band, substantially as and for the purposes specified.

77,663.—WASH BOILER.—I. D. Seeley, Hudson, Wis.

I claim, in a washing boiler, the combination of the plates, B, forming vertical compartments, the transverse and diagonally-placed plates, B2, forming a continuous flange in extension of said plates, B, and the perforated plate, C, placed above the flanges, B2, substantially as and for the purpose set forth.

77,664.—BEER COOLER.—Henry Shlaudeman, Decatur, Ill.

I claim, 1st, The pyramidal cooler, C, when the same is formed of either plain or corrugated sides, C' C', and the whole is so constructed and arranged as to leave an open chamber for the reception of water, substantially as described.

2d, The independent base trough, A, when the same is constructed and arranged substantially as described, and for the purpose specified.

3d, The pyramidal cooler, C, when the same is formed of either plain or corrugated sides, C' C,' and the whole is so constructed and arranged as to leave an open chamber for the reception of water, in combination with the base trough, when the whole is constructed and arranged substantially as described, and for the purpose specified.

77,665.—SEWING MACHINE.—George Slater (assignor to George Washington Belding), London, England.

I claim a simple rocking shaft, K, and an incircling, tubular rocking shaft, J, combined with each other, and respectively, at one end, with a cam, Y, operating the feed plate, X, and lever, N, operating the shuttle carrier, O, and at the other, with the eccentrics, G H, upon the driving shaft of a sewing machine, all substantially in the manner and for the purpose herein set forth.

77,666.—AUTOMATIC FEEDER FOR EVAPORATORS.—Jonathan Smead, East Wallingford, assignor to himself and Thomas Steward, Clarendon, Vt.

I claim, 1st, The perforated casings, arranged within the pans, in relation with the floats operating the sap or liquid-supplying mechanism, substantially as and for the purpose specified.

2d, The arrangement of the chamber, E, the case, F, valve, c, with its stem, d, and bent lever, D, in relation with each other, and with the stem, b, of the float, C*, the pipe, f, and the reservoir pipe, G, substantially as and for the purpose set forth.

3d, The valves, m, arranged upon the stems, i, of the floats, J, and in relation with the funnel-shaped mouth piece, g, surrounding the orifices, e', of the reservoir pipe, G, substantially as and for the purpose specified.

4th, The elastic diaphragm, e, arranged in the end of the case, F, and in relation with the valve stem, d, operated by the float, C*, and the pipe, f, substantially as and for the purpose specified.

77,667.—FERTILIZER.—Amor Smith, Cincinnati, Ohio.

I claim, as a new article of manufacture, cracklings, reduced to a powder, for use in combination with phosphates as a fertiliser.

77,668.—SUGAR EVAPORATOR.—W. C. Smith, Warrensburg, Mo.

I claim, 1st, The air-heating chambers, B1 B2, when combined with the fire box, B, in the manner and for the purpose herein set forth and described.

2d, The dampers or slides, D D1 D2, when arranged and operated as and for the purpose shown and described.

77,669.—COOLING AIR AND LIQUIDS, AND MAKING ICE.—Daniel E. Somes, Washington, D. C.

I claim, 1st, Atomizing liquid over and over in a chamber or vessel, without removing it from said chamber or vessel, substantially as and for the purpose set forth.

2d, Atomizing liquid in a vacuum, or partial vacuum, over and over again, without removing it from said vacuum or partial vacuum.

3d, Generating and using gas, substantially in the manner and for the purpose set forth.

4th, A small portable cooler, constructed and operated substantially as set forth, as an article of manufacture.

5th, The atomizers and chamber, in combination with the pump, or its equivalent, substantially as described.

6th, The atomizers and chamber, in combination with pipes or channels, and means for conducting away heat, substantially as described.

7th, The atomizers and chamber, the receiver, the pump, and means for cooling or freezing, substantially as described.

8th, The atomizers and chamber, the gas generator, and pump, or its equivalent.

9th, The atomizers and chamber, the gas generator and receiver, the pipes, and means for cooling, substantially as described.

10th, The atomizers and chamber, the pump or its equivalent, and the gases, air, or liquids, substantially as set forth.

11th, Means for regulating the supply of gas, air, or liquids, in combination with the atomizers and chamber, substantially as set forth.

12th, The chamber and apartments with non-conducting substances, and double or multiple walls, substantially as and for the purpose set forth.

77,670.—STEAM GENERATOR.—Obed Spencer, Jacksonsburg, Ohio.

I claim the combination and arrangement of the boilers and tubes with the furnace, F, whereby the entire surface of the boilers, A, and tubes, B C, is subjected to the action of the heat, substantially as and for the purpose specified.

77,671.—APPARATUS FOR RECTIFYING SPIRITS.—Jacob Springer (assignor to himself, A. C. Flinn, and H. B. McNeal), Lancaster, Pa.

I claim the construction and arrangement of the doubling tub, with its three chambers, D E F, copper or metallic heating dome, H, or its equivalent, in combination with the pipes, 5 6 11 and 12, arranged substantially in the manner and for the purpose specified.

77,672.—LATHE REST.—Edward Stahlbrodt, Rochester, N. Y.

I claim the combination of slotted apron, B, knot, g, screw, d, plate, f, and tool carriage, A, when constructed and arranged substantially as described.

77,673.—GLAZING AND COLORING TOBACCO PIPES.—John H. Starck, Milwaukee, Wis.

I claim, 1st, The process of glazing tobacco pipes by the use of milk, gelatine, water and shellac, substantially as described.

2d, The process of glazing tobacco pipes by the use of the whites of eggs and gum shellac, substantially as described.

3d, The process of coloring tobacco pipes by the use of the dye wood solution, substantially as described.

77,674.—APPARATUS FOR PRODUCING MOTIVE POWER.—Edward Stockton and William O. St. John, Folsom, Cal.

We claim, 1st, The combination and arrangement of the springs, I I, weights, P P, and gears, J J, said gears being so connected with their respective shafts that they remain stationary, while the shafts are turned to wind up the springs and weights.

2d, The ratchet wheels, L L, for connecting the gears with the shafts, in combination with the couplings, E E, substantially as and for the purposes described.

77,675.—HARVESTER RAKE.—Ole O. Storle, North Cape, assignor to himself and Isaac N. Mason, Milwaukee, Wis.

I claim, 1st, Tilter, I, levers, M and N, rake frame, F, and pin, O, in combination, substantially as described.

2d, Rake, B, chain, C, spur wheels, D and D, and rake frame, F, and lever, G, in combination, substantially as and for the purpose described.

3d, Rake, B, tilter, I, shaft, K, rake frame, F, lever, G, levers, M and N, and pin, O, in combination, substantially as and for the purpose described.

77,676.—SHELF REST.—G. L. Swett, Leominster, Mass.

I claim the standard or shelf rest, B, when the same consists of a series of truncated cones, the larger base of each being upward, when the same is combined with and used for supporting adjustable shelves, substantially as described and for the purpose set forth.

76,677.—CATTLE GUARD FOR RAILROAD.—Hugh Tagart, Jacksontown, Ohio.

I claim the combination of the case, A, shaft, H, and weight, B, with the shaft, C, provided with a series of vertical rods, D D, when constructed substantially as described, and operated as and for the purpose specified.

77,678.—LIFTING JACK.—R. M. Thompson, Coshocton, Ohio.

I claim, 1st, The lever, C, and standard, B, in combination with stirrup iron, G, substantially as described.

2d, The base, A, standard, B, lever, C, guard piece, D, rod, E, box, F, and stirrup iron, G, the whole being combined and arranged substantially as described.

77,679.—POTATO WASHER.—S. H. Tift, Morrisville, Vt.

I claim the arrangement of the vessel, B, provided with perforations, x x, and legs, h h, with the arms, C C, agitator, D, and outside vessel, A, the several parts being constructed and operated substantially as and for the purpose specified.

77,680.—MODE OF CONSTRUCTING CARRIAGE WHEELS.—Samuel Toomey, Wilmot, Ohio.

I claim the method of constructing bent-rim carriage wheels, with the ends of the rim abutting together, and with spaces between the rim and the shoulders of the spokes, before putting on the tire, and then closing the rim and spoke shoulders together by the shrinking on of the tire, substantially as and for the purpose herein specified.

77,681.—HANDLE FOR SMOOTHING IRONS.—Robert W. Towle, Searsport, Me.

I claim the combination of the handle, a, spring, c, lever, d, connecting rod, e, upright, g and j, with the iron, b, constructed and operating substantially as described, and for the purpose specified.

77,682.—GATE.—G. W. Tucker, Elba Township, Ill.

I claim the bail, E, socket, D, hooks, F, and roller, G, in combination with the gate, A, for the purpose substantially as herein set forth.

77,683.—PEA SHELLER.—Stephen Ustick, Philadelphia, Pa.

I claim, 1st, The combination and arrangement of the longitudinal strips, c, with the hopper, E, substantially in the manner above described, and for the purposes specified.

2d, The combination of the roller, B, with the hopper, E, when said roller has annular depressions, i, which coincide with the spaces, f, substantially as and for the purpose set forth.

77,684.—RETURN FLUE STOVEPIPE.—Henry Vatter, Lawrence, Mass.

I claim, 1st, A return flue stovepipe, constructed and arranged for operation as and for the purpose substantially as described.

2d, The damper, C, constructed as described, in combination with the partition, A, and the pipe, for the purpose and substantially as described.

77,685.—ACID POWDER AS A SUBSTITUTE FOR YEAST.—W. J. Walker, Brooklyn, N. Y.

I claim, 1st, Producing a powder, which is an admirable substitute for yeast, by combining with a dry farinaceous substance a certain quantity of hydrochloric (commercial muriatic) acid, when the same is prepared substantially as described and for the purpose specified.

2d, Mixing with a powder, composed of a dry farinaceous substance and muriatic acid, a certain quantity of argal, cream of tartar, or other like acid powder, substantially as is described, and for the purpose specified.

3d, The mixing the powder with an alkaline carbonate, in such proportions with flour or meal, as to make a self-raising bour or meal, for the purpose of bread, pastry, etc., substantially as described.

77,686.—HITCHING POST.—Bartholomew Walther and Peter Walther, New York city.

We claim a hollow hitching post, A, covered by a perforated metallic cap, and provided with inclined water-escape channels at the bottom of its cavity, B, substantially as and for the purpose detcribed.

77,687.—SHAFT ATTACHMENT TO WAGONS.—Walter Ward, Mount Holly, N. J.

I claim a carriage shaft, or thill connection or coupling, made of the pieces, A B C D, interlocked or breaking joint with each other, and firmly united, so that the shaft or thills cannot become detached, substantially as herein described and represented.

77,688.—COOKING STOVE.—E. D. Weston, Taunton, Mass.

I claim the arrrngement of the air heating flue, G, the fire place, A, the smoke flue, K, the oven, E, and the air flue or flues, M, provided with one or more openings, I, to lead air into the oven, as set forth.

Also, the arrangement of one or more openings, J, with the flue, G, the fire place, A, the oven, D, one or more openings, I, the flue or flues, M, and the air flue, G.

Also, the arrangement of the air flue, G, and its induction openings, H, so as to extend over and in front of the front plate of the fireplace, as represented.

Also, the arrangement of the air flues, G M, the oven, E, the fireplace, A, the smoke flue, K, and flues, F, underneath and in rear of the oven, the oven being provided with the air induction and eduction openings, I J, as set forth.

77,689.—DEVICE FOR PREVENTING AND CURING CRIB BITING IN HORSES.—George H. White, Huntington, N. Y

I claim the device herein shown, attached to the manger or any place where the horse may be fastened, and to operate by the motion caused by the biting of the horse, substantially as and for the purpose herein shown.

77,690.—CHECK VALVE.—Peter White, St. Louis, Mo. Antedated April 22, 1868.

I claim, 1st, The combination of the shaft, K, thumb screw, I, shaft, N, valve, A, valve seat, B, socket, P, and cylinder, E, substantially as herein set forth.

2d, The arrangement of the valve, A, and seat, B, as herein set forth and described.

77,691.—HARVESTER.—W. N. Whiteley, Springfield, Ohio.

I claim, 1st, The shell main frame, A, cast in a single piece, with a recess fitted to receive the gearing, and another recess, L, to serve as a receptacle for tools, in connection with the cover or platform, M, likewise cast in a single piece, so as to enclose the gearing and cover the tool box with the same piece, substantially as set forth.

2d, The drag bar, R, constructed and attached to the frame and shoe in the manner described, in connection with the brace, Y, and the standard, Z, and coupling arm, U, as set forth.

3d, The lever, W, attached and operating as set forth.

4th, The drop latch, l', constructed and located as described.

77,692.—DUMPING SLED.—E. R. Whitny, Plattsburg, N. Y.

I claim, 1st, The sliding bars, B, when used in combination with a cord, F, for the purpose of elevating the front part of a body, D, of a sled or wagon, and operated as and for the purpose specified.

2d, Operating a dumping body, D, by means of the same team which draws the same, without detaching and reattaching said team, substantially as and for the purpose specified.

3d, The arrangement of the posts, C, pulleys, h and j, with the cords, F, when operated by means of sliding bars, B, as and for the purpose herein set forth.

77,693.—SHEEP SHEARING TABLE.—George Wiggins, (assignor to himself, Charles Herrington, and Hiram Maxfield), Ortonville, Mich.

I claim the sliding bar, C, in conjunction with the slots, D, grooves, F, the sliding fastening blocks, G' and G'', the strap, I, shaft, J, crank, K, ratchet, L, and pawl, M, when arranged and operating substantially as and for the purposes specified.

77,694.—PUMP.—Julius Wilcke, Newark, N. J.

I claim, 1st, The combination, with the pump barrel, A, having within it a reciprocating piston and valve cylinder or chamber, C, connected with the pump barrel by end passages, a a', of a loose or independent valve, F, constructed with an intermediate diaphragm, e, and separate suction and delivery ports controlling separate suction and delivery ports or passages in the valve chamber, as the valve is shot by the pressure of the fluid at the commencement of the return stroke of the piston, substantially as specified.

2d, The intermittently reciprocating valve, F, with its dividing diaphragm, e, and side inlets and outlets, controlling suction and delivery ports in the valve cylinder by the pressure of the fluid in the discharge stroke of the piston, as specified, when said valve is of tubular or cylindrical form, and made with splits or divisions to give to it an elastic character, essentially as shown and described.

77,695.—MODE OF HANGING SIGNS OR BANNERS. — Simon Wing, Boston, assignor to himself and Eli F. Southward, East Boston, Mass.

I claim making the ground of signs or banners of an open work or network of twine, thread, silk, cord, wire, or other material that will allow the free passage of air, substantially in the manner and for the purpose set forth.

77,696.—CORN HARVESTER.—James F. Winchell, Springfield, Ohio.

I claim, 1st, The swinging lever or rest, I, in combination with the cam, K, or its equivalent, for imparting to it the movements, substantially as described.

2d, The corrugated roller, G, arranged in rear of the cutters, for delivering the stalks to the platform, substantially as set forth.

3d, The combination of the roller, G, and the platform, H, substantially as set forth.

4th, Providing the groove, a', in the cam, K, with the projection, e'', for holding the lever, I, in position, until operated by driver, as set forth.

5th, The combination of the lever, I, connected by the arm, a, to rock shaft, J, with the weighted arm, m, or its equivalent, for automatically returning the lever to its position, substantially as set forth.

77,697.—CHAIR AND LOUNGE. — Torwald Winter, Boston, Mass.

I claim the combination and arrangement of the rotary chair seat and back and the lounge frame, substantially as shown and described.

Also, combining with a rotary chair seat, rollers, k, supporting the seat upon a bed piece, b, and enabling the chair to be rotated upon said bed piece substantially as described.

77,698.—HORSE COLLAR.—Christian Wolf, Danville, Ill.

I claim the arrangement of a wooden collar, A, having the straps or plates, B F and H, rim guide, E, and holdback rings secured to it, as described, with the ratchet bar, K, guide, I, pawl, j, and spring, h, all the parts being constructed and used as and for the purpose specified.

77,699.—VEGETABLE WASHER.—U. A. Woodbury, Morrisville, Vt.

I claim the combination of the slotted bucket, A E, with the revolving frame, a b b d, as described, which can be used in any water vessel of suitable size, for the purposes specified.

77,700.—SPUR WHEEL.—C. F. Woodruff, Newbern, Tenn.

I claim, 1st, The rim of a spur wheel, as constructed and cast in sectional segments, A A', united and bound together by the double dovetail shanks, a a, of the cogs, B B, in the manner herein described.

2d, The double dovetail shanks, a a, of the cogs, B B, in combination with the sectional segments, A A', constructed, arranged, and operating substantially as and for the purpose described.

3d, The combination of the arms, C C, the shanks, a a, the pins, b b, and the sectional segment rim, constructed, arranged, and operating substantially as and for the purpose described.

77,701.—HORSE COLLAR.—William Youngblood, New York city.

I claim, as a new article of manufacture, an india-rubber horse collar of tubular form, when said collar is divided longitudinally by the thick india-rubber partition, a forming an increased bearing surface for the hames, as herein shown and described.

77,702.—CULINARY APPARATUS.—Heinrich A. Zoff, Milwaukee, Wis.

I claim the tight bottom or shell, D, containing a recess, F, to catch the condensed steam, and the raw, tasting vegetable water, and prevent this liquid from falling into the water below, with cover, G, and strainer, H, substantially as and for the purpose described.

77,703.—PORTABLE PIPE ORGAN.—A. B. Felgemaker and S. L. Derrick, Buffalo, N. Y.

We claim a compound wind chest, D, having two or more divisions, e1 e2, each division having distinct air passages to supply a distinct set, row, or rows, of pipes, for the purpose and substantially as described.

77,704.—MEASURING AND LAYING OUT GARMENTS.—Herman Mengel, Philadelphia, Pa.

I claim, in combination with an instrument having laterally and vertically-adjustable scales, B B' C D E, the scales, n, vertically adjustable in the instrument, for laying out, on cloth or other fabric, measures for upper garments, operating substantially as described.

77,705.—CEMENT FOR ROOFING, ARTIFICIAL STONE, COATING Iron, Wood, etc.—Antonio Pelletier, Washington, D. C.

I claim, 1st, The chlorides of the alkaline earths, true earths, and heavy metals, in combination with the corresponding oxides of these, for the purpose of producing insoluble oxichloride compounds, substantially as described and set forth.

2d, In combination with the oxides and chlorides, organic substances, such as vegetable and animal fiber, glue, hair, snoddy, substantially as described, and set forth.

3d, In combination with oxichlorides and organic substances, finely divided granulated fibrous or pulverized mineral ingredients of any kind, substantially as set forth.

4th, The above mentioned composition, with or without the incorporation or external coating with silicate of soda, either by itself, or ground together with mineral colors, substantially as described and set forth.

5th, In combination with the cement-composition, for preventing its too rapid sondification, solutions of starch, gum, dextrine, sugar, gelatine, borax, or sulphate, substantially as described and set forth.

77,706.—CAR ELEVATOR.—Henry Arden, Cincinnati, Ohio.

I claim, 1st, The combination of the frame, A, shafts, C, and arms, G, with the links, e, and rod, f, substantially as and for the purpose set forth.

2d, The shafts, C, and pulleys, D, in combination with the ropes or chains, E, and beams, F, or their equivalents, all as shown and described.

3d, The combination of the beams, F, and lifting hooks, b, or their equivalents, all as shown and described.

4th, The combination of the arms, G, shafts, C, and pulleys, D, all as shown and described and for the purpose specified.

5th, The combination of the shafts, C, pulleys, D, and ropes or chains, E, all as shown and described and for the purpose specified.

REISSUES.

2,923.—DITCHING MACHINE.—David Whisler, Union Township, Ohio. Dated Dec. 31, 1867.

I claim, 1st, The adjustable feature of the mold board and knives for cutting a wide or narrow ditch, substantially as described.

2d, The peculiar construction of the shovel, as and for the purpose set forth.

3d, The construction of the colter, as and for the purpose specified.

4th, The hinged platform, T, for regulating the depth of the furrow or ditch, substantially as described.

5th, In combination with the above, screw, h, and spring, t, substantially as set forth.

6th, The axle, B, wheels, C C, beam, A, platform, T, screw, h, springs, t, and vertical knife, P, all combined and arranged as and for the purpose set forth.

2,924.—HEAD BLOCK FOR SAW MILL.—Simon F. Stanton (assignee of J. M. Stanton and S. F. Stanton), Manchester, N. H. Dated May 1, 1866.

I claim the combination arrangement of the pinions, D D D, and double sets of racks, b b b c c c, for moving the uprights by the turning of the shaft, E, substantially as herein set forth.

Also, the arrangement of the shaft, E, in sections, coupled together by clutches, F F, so as to be connected or disconnected at pleasure, constructed and operating substantially as and for the purpose herein specified.

Also, the notched guide, R, in combination with the lever, Q, which actuates intermediately the pawl, P, ratchet wheel, O, shaft, E, pinions, D D D, and racks, b b b, or the equivalent thereof, for moving the uprights different and determinate distances, constructed and operating substantially as herein specified.

Also, the clamp hooks or dogs, M M M, arranged and operated substantially as and for the purpose herein set forth.

DESIGNS.

3,009.—STAKE TO MARK GRAVES.—Gustavus Arnd, New York city.

3,010.—TRADE MARK.—John Fahnestock, Astoria, N. Y., Assignor to B. E. Barker, Indianapolis, Ind.

3,011.—STATUETTE OF W. E. CHANNING.—T. R. Gould, Boston, Mass.

3,012.—MEDALLION HEAD OF GENERAL GRANT.—W. M. Marshall, Philadelphia, Pa.

3,013.—WEATHER GLASS.—C. F. Martine, Boston, Mass.

2,014.—TINMAN'S STOVE.—D. W. Pepper (assignor to N. G. Taylor & Co.), Philadelphia, Pa.

3,015.—FIRE CYLINDER CAP FOR A STOVE.—J. R. Rose and E. L. Caley (assignors to Cox, Whiteman & Cox), Philadelphia, Pa. Antedated April 7, 1868.

3,016.—BOX.—W. H. Savournin, Philadelphia, Pa.

3,017.—TRADE MARK.—Carl Schultz and Thomas Walker, New York city.

3,018.—CHURN BODY.—A. D. Smith, Grafton, Ohio.

EXTENSIONS.

TURNKEY.—Melvin Jinks, Dansville, N. Y. Letters Patent No. 10,312. Dated Dec. 12, 1853.

I claim the adjustable claw, E, constructed and arranged substantially as described, in combination with the claw, b, and the rolling fulcrum, having a limited motion.

HINGE FOR INKSTAND COVERS.—Joseph Nock, Philadelphia, Pa. Letters Patent No. 10,310. Dated Dec. 13, 1853.

I claim the application of the stamped round past, and the solid part, or the moving lid or cover, filled together as a hinge, which forms a rounded smooth turned face, and the manner in which the pin is connected with both parts, as herein described, using for that purpose the aforesaid two pieces to form a regular curvilinear or round-turned hinge, made of any materials which will produce the intended effect.

PROCESS OF VULCANIZING CAOUTCHOUC COMPOUNDS.—L. Otto P. Meyer, Newton, Conn. Letters Patent No. 10,339. Dated December 20, 1853.

I claim the producing of smooth and glossy surfaces upon the hard compounds of caoutchouc and other vulcanizable gums, by means of the use of oil, or other equivalent substance, applied to the surface of the prepared gum, and between the gum and the plates of metal, or the molds, substantially as herein described.

CLEANSING HAIR AND FEATHERS FROM INSECTS, ETC.—William Wisdom, Brooklyn, N. Y. Letters Patent No. 10,347. Dated Dec. 20, 1853.

I claim purifying hair and feathers by destroying all noxious insects or infectious matter contained therein, by subjecting the same to a vapor bath of chlorine gas, after the material has been cleansed by a bath of sal soda, in the manner and for the purpose specified.

MACHINE FOR HULLING AND SCOURING COFFEE.—Robert P. Walker, New York city.—Letters Patent No. 10,328. Dated Dec. 20, 1853.

I claim the combination of the springing rubber flaps, or scourers and polishers, e e e, with the angularly-set hullers or beaters, c d, the whole being constructed and arranged in any equivalent manner to that herein described, and operating as set forth.

SHUTTER HINGE.—Harvey Lull, Hoboken, N. J.—Letters Patent No. 10,477. Dated Jan. 31, 1854. Antedated Jan. 2, 1854.

I claim the so forming of a self-locking shutter hinge, cast in two pieces, as that the blind or shutter hung thereon may swing open or shut on a horizontal plane, and lock when opened to its limit, and so that, also, when locked open, the strain shall be taken off from the spindle and thrown on to cam arms, and thus effectually relieve the spindle from the weight or strain of the shutter, substantially as described.

HOT-AIR REGISTER.—Edward A. Tuttle Brooklyn, N. Y. Letters Patent No. 10,371. Dated Jan. 3, 1854. Reissue No. 1,412. Dated Feb. 1, 1863.

I claim so combining the connecting rod, or arrangement, which transmits motion to the fans with the thumb piece, or attachment, by which it is actuated, and with the fans themselves, that it shall rest and ride upon anti-friction bearings, o o, formed on the fans, substantially as above described.

GUIDE FOR SEWING ON BINDING.—William H. Sweet, Foxborough, Mass., administrator of Henry L. Sweet, deceased.—Letters Patent No. 10,344. Dated Dec. 20, 1853.

I claim the doubling-guide as not only made with a flat mouth, or one capable of receiving the ribbon, tape, or binding in a flattened state, but with a bent channel or sides, such as shall gradually bend or double it, and discharge it at the other end in a doubled state, ready to be applied to any article conveniently placed to receive it, and leave it sewed therein, as stated.

FLOOR PLATES OF MALT KILNS.—Mathew Stewart, Philadelphia, Pa.—Letters Patent No. 10,370. Dated Jan. 3, 1854.

I claim, 1st, The characteristic mode in which I construct the plates with downward edges at right angles with the surface of the plate, substantially as and for the purpose herein described and illustrated.

2d, I claim the bearing and combining block, with the peculiar arrangement of the slots or grooves, or its equivalent, substantially and for the purpose as herein described.

3d, I claim the combination of the plates with the bearing and combining blocks, or their equivalents, and the peculiar manner of securing the plates and blocks down to the wrought iron bars by means of the wire holes in the vertical edges of the plates, or their equivalents, substantially and for the purpose as herein described and illustrated.

OPERATING CUT-OFF VALVES OF STEAM ENGINES.—William Wright, New York city.—Letters Patent No. 10,396. Dated Jan. 3, 1854.

I claim the employment of a rotating eccentric hub, on which the toes, or their equivalents, of the lifters rest when the valves are closed, substantially as specified, when this is combined with a cam connected therewith, and which turns eccentrically thereon, for the purpose of opening and closing the valve, and regulating the period of closing the same, substantially as specified.

And I also claim combining with the said hub and cam a slide within them, and acting on an oblique groove within the cam, and a straight slot in the hub, substantially as specified, to determine the period of closing the valve, while the period of opening remains the same as specified, and this I claim whether the said slide be operated by a governor or by other means.

MORTISING MACHINE.—H. B. Smith, Smithville, N. J.—Letters Patent No. 10,422. Dated Jan. 10, 1854.

I claim the afore-described combination for reversing the chisel by power, applied by friction, with band or otherwise, and stops, operated so as to stop the chisel when reversed, in the manner essentially as set forth.

ARRANGEMENT FOR CUTTING SCREWS IN LATHES.—Joseph Nason, New York city.—Letters Patent No. 10,388. Dated January 3, 1854.

I claim, 1st, The mode of constructing and combining the stud, the tube, and the guide screw, by which guide screws of the various patterns used in screw cutting may be put on or taken off expeditiously.

2d, The mode of constructing the tool bearer, generally, particularly as regards placing the slide rest behind the work, whereby the cutting tool is brought into such relative position with the shaft and the mandrel, that the operation of raising the tool bearer from the rail removes the tool from the work.

3d, The tool lifter, constructed substantially as described, and employed for the purposes and in the manner herein specified.

4th, The combination of the guide screw, the threaded block, and the tool bearer, with the shaft, substantially as set forth, by which (1) the requisite traversing motion is imparted to the cutting tool; (2) the operation of releasing the block from the guide screw, and removing the tool from the work are simultaneously performed; and (3) the tool bearer may be turned back out of the way when not in use.

GRAIN HARVESTER.—Aaron Palmer, Brockport, N. Y., and Stephen G. Williams, Janesville, Wis.—Letters Patent No. 10,459. Dated Jan. 24, 1854.

We claim the method of transferring motion to the rake on the platform from the driving wheel, by means of the double curved rack and pinion on the axle of the driving wheel, the iron arm, c, latch, p, and spring, m, as herein described.

Also, the method of hanging the reel so as to dispense with any post or reel bearer next to the standing grain, as herein described, thereby preventing the grain from getting caught and being held fast between the divider and reel supporter.

AIR-HEATING FURNACE.—C. R. Harvey, New York city. Letters Patent No. 10,457. Dated Jan. 24, 1854.

I claim constructing the bonnet or top of the fire chamber with a depression at the center, into which the smoke or exit-pipe enters, so that the heat is equalized all around, and the expansion and contraction are made uniform, as above specified.

ROLLER FOR SCARFING THE EDGES OF SKELPS FOR LAP-Welded Tubes.—James McCarty, Reading, Pa.—Letters Patent No. 10,478. Dated Jan. 31, 1854.

I claim a pair of rollers, constructed, arranged, and adjusted substantially as herein described, so as to bevel the opposite edges of skelp plates of different widths on opposite sides of the same.

MACHINE FOR CLEANING AND ASSORTING BRISTLES.—Geo. E. Burt, Harvard, Mass.—Letters Patent No. 10,498. Dated February 7, 1854.

I claim the combination of machinery for combing or straightening the bristles, and machinery for separating or assorting them, as specified.

I claim the combination of the two movable combs or rakes, T U, and the two lifter wheels, G O, and their carrying endless belts, E and L F and M, so arranged as above described, the whole being for the purpose of first holding the mass of the bristles by one part or portion of it, and lifting and combing the remainder of it, and subsequently seizing and lifting it by such combed part or portion, and combing the part previously seized, all as specified.

And, in combination with the machinery for combing or straightening the bristles, and machinery for assorting or separating them, I claim the endless guide belt, l', the sprig board, p', and rapping apparatus or hammer, r', as applied and made to operate substantially in manner as specified.

I claim the combination and arrangement of the two endless brush belts, V W, and two series of draft rollers, and their two sets of endless bands, as made to operate together and assort the bristles, substantially as hereinbefore specified.

I claim the combination of the combs, u1 v2, and their grooves, t2 t2, etc., with the delivery rollers, so as to operate substantially in the manner and for the purpose specified.

MAKING THICK PAPER.—Samuel G. Levis, Kellyville, Pa.—Letters Patent No. 10,519. Dated Feb. 14, 1854. Reissue No. 2,780. Dated Oct. 22, 1867.

I claim, 1st, Passing or carrying a sheet of paper pulp through or between the press rolls, and expressing the water therefrom between two endless felts so arranged that the water may pass through the felts and run off freely in front of the rolls.

2d, Running or operating two or more forming cylinders in connection with the press rolls, by means of or in combination with two endless felts, so arranged that the water passes through the felts and runs off at the end of the rolls.

3d, The combination of the two forming cylinders, C and D, the two endless felts, E and G, and the two squeeze rollers, F F, arranged and operating substantially as described.

USE OF FUSIBLE DISKS IN STEAM BOILERS.—Wm. Burnett, San Francisco, Cal., and John Absterdam, New York city. Letters Patent No. 10,573. Dated Feb. 28, 1854.

We claim placing in a pipe, which is connected with a steam boiler, a fusible plug or disk, said plug or disk being so far removed from said boiler, but so connected with the water therein, that when the water is sufficiently high, the plug or disk will be in contact, or so surrounded with water cooler than that in the boiler as to prevent it from being fused, but when the water in the boiler shall fall below a proper hight, the steam will enter and come in contact with said plug, or so surround it as to cause it to melt, the same being for the purpose specified.

VULCANIZING INDIA-RUBBER AND OTHER GUMS.—L. Otto P. Meyer, Newton, Conn.—Letters Patent No. 10,586. Dated February 28, 1854.

I claim the heating or curing of the material commonly known as the hard compound of vulcanized caoutchouc, or other vulcanizable gums, by means of the immersion of the material in or under water, or other suitable liquid during the process of heating or curing, substantially as herein described.

COTTON-PICKER CYLINDERS.—James Pitts, Clinton, Mass.—Letters Patent No. 10,578. Dated Feb. 28, 1854.

I claim the constructing the screw so that the periphery of the metal intervening between any two immediately adjacent orifices shall be of a length equal to or greater than that of the staple of cotton or other fibrous material to be picked, in order that the fiber shall not lap around the said periphery and become connected, attached, or tied by its ends, as stated.

I also claim the improvement of constructing the cylinder screw of a hollow perforated metal cylinder, without arms or ribs, and with open hollow cylindric journals at its two ends, as stated, in order that the cotton may be drawn out of one journal by the suction draft, and any obstruction removed by a person's hand and arm introduced through the other journal, as specified.

DERRICK.—J. B. Holmes, New York city.—Letters Patent No. 10,544. Dated Feb. 21, 1854.

I claim, 1st, The combined arrangement of the collar upon the mast, the revolving platform supported upon it and clamped below it, and the tension rods from said platform to the revolving masthead cap, in the manner and for the purposes described.

2d, Pivoting the heel of the derrick boom upon the revolving platform in the locality substantially such as is herein represented and described, that is, upon that portion of the platform which is beyond the center of the platform when measuring from the point of suspension of the weight.

STRAW CUTTER.—Warren Gale, Peeksville, N. Y.—Letters Patent No. 10,592. Dated March 7, 1854. Reissue No. 2,795. Dated June 26, 1866.

I claim, 1st, The fixed pivot, F, on which the moving knife works, provided with a flange for fastening to the cutter box, and made adjustable thereon by means of slots and bolts, or their equivalent, substantially as and for the purpose herein specified.

2d, I also claim the arrangement of the adjustable gage plate, G, in front of the fixed knife, in proportion to the increased distance at which it is adjusted away from the knife, to give a longer cut, and *vice versa*, substantially as herein set forth.

SUSPENDING EAVES TROUGHS.—C. D. Woodruff, Toledo, O.—Letters Patent No. 10,606. Dated March 7, 1854.

I claim the mode of suspending and fastening eaves troughs, as herein described.

MACHINE FOR SPLITTING RATTANS.—A. M. Sawyer, Athol, Mass.—Letters Patent No. 10,614. Dated March 7, 1854.

I claim the employment of a tubular spurred cutter, or its equivalent, in combination with a guide for holding and guiding the stick thereto, substantially as hereinbefore described.

HANGING OF THE GRIPING JAW OF SPIKE MACHINES IN Weighted Levers.—J. H. Sweet, Pittsburgh, Pa.—Letters Patent No. 10,645. Dated March 14, 1854.

I claim the so hanging of the griping jaw in weighted levers, or their equivalents, as that when two spikes, or a spike and a blank, come in between the griping jaws at one time, the said jaw may rise and yield to the excess of metal between the dies, and prevent the breaking of any of the parts, substantially as herein described.

MACHINE FOR MAKING SHOVEL HANDLES.—L. L. Bartlett, Bangor, Me., administratrix of Russell D. Bartlett, deceased. Letters Patent No. 10,631. Dated March 14, 1854.

I claim the combination and arrangement of the bed, M, the rotary holder, O, one or more vertical movable cutters, V W H', and one or more stationary cutters, I' K', as made to operate together and from the D or head part of the shovel handle, substantially as specified.

And I claim the combination of the curved knife knife, o, and the arc knife p, so applied together as not only to allow them to be separated for the purpose of being ground, but to enable them to cut out the opening of the shovel handle, as specified.

And I claim the combination, applied to the shaft of the rotary holder and gear wheel' A', for the purpose of operating the holder, as specified, the said combination, consisting of the cam blocks, O' M', the arm, L', the spring bolt N', its cam, P', and the two studs, e' and h', the whole being constructed and made to operate together, substantially as specified,

HARVESTER.—W. H. Seymour, Brockport, N. Y.—Letters Patent No. 10,707. Dated March 28, 1854.

I claim the combination of the shaft, E', for rotating the pinion, the shaft, I, for turning and carrying the rake, and connecting mechanism, constructed and arranged as described, whereby the rake is turned up and down and firmly held in either position in a simple and convenient manner, without producing an undue strain upon any part of the driving gear

I also claim the adjustment of the rake at varying hights from the platform, in its elevated and depressed position, by means of the device herein described or the equivalent thereof.

SELF-FASTENING SHUTTER HINGE.—Ambrose Nicholson, Poland, N. Y.—Letters Patent No. 10,673. Dated March 21, 1854.

I claim the eccentric extension, a', and recess, E, of the plate, A, in combination with the pin, c', of the plate, C, by which, in connection with the elongated eye, b', and cylindric pin, d', I am enabled to move the shutter and catch it or release it, without giving it any upward or downward motion, as herein set forth.

MACHINE FOR CUTTING VENEERS.—Carmi Hart, Bridgeport, Conn.—Letters Patent No. 10,739. Dated April 4, 1854.

I claim, 1st, Cutting veneers, or other thin stuff, by giving to the shaving knife a rectilinear movement toward and through the log, at the same time that a rectilinear movement is given to the log either transversely or diagonally to the movement of the knife, so as to produce a long continuous drawing cut, as described, whether the said movements of the knife and log are produced by the precise arrangement or mechanical means described or any other substantially the same.

2d, Making the ways, N N, upon which the log carriage moves, adjustable, as described, relatively to the ways in which the knife and cutting table move, for the purpose of giving more or less of a drawing action to the cut, as the nature of the stuff to be operated upon may require.

3d, Attaching all the necessary appendages for holding the log and feeding it to the knife to a turn table, L, capable of being adjusted circularly within the main frame or part, K, of the log carriage, as described, for the purpose of presenting the grain of the stuff at any desired angle to the edge of the knife or direction of the cut.

4th, Suspending the log or block above the knife, by griping it with clamps Y Y, which form part of a suspending head which supports the weight of said log or block, and prevents it dragging over the edge of the knife during the backward movement of the latter, and only allows it to be lowered under the control of suitable feeding mechanism.

5th, Setting the lever handle, x, which holds the clamps upon the log, free from the notched bar, 12, by which it is secured for that purpose by means of the bar, 32, and the inclined block, 35, of which the former is attached to the suspending head and the latter to some fixed point on the turn table of the log carriage, and the former is made to slide, by coming at a proper time in contact with the latter, in such a way as to raise the lever handle, as herein described.

6th, Making the slots in the clamps which receive the bar, m, and screw, n, of such length, that after the clamps are arrested by coming in contact with the proper part of the log carriage or turn table, the motion of the follower and the other parts of the feed motion may continue till it is desirable to stop them, as herein described.

7th, The mechanism, herein described, for rendering the pawl of the feed motion imperative, and thereby stopping the descent of the suspending head and the feed of the log at the proper time, to wit, the bar, 24, pin, 25, spring, 27, rod, 28, arm, 29, shaft, 30, feather, 31, and angle piece, 33, the whole being combined and applied substantially as herein set forth.

SAFETY VALVE.—Henry Waterman, Hudson, N. Y. Letters Patent No. 10,343. Dated November 15, 1853. Reissue No. 2,675. Dated July 9, 1867.

I claim, 1st, The piston, F, attached to the weighted end of the valve lever within the cylinder, G, and immersed in the liquid in the cylinder, combined and operating in the manner and for the purposes herein described.

2d, I also claim the concentric rim or ledge, I I, and the overhanging part of valve, k k, constructed, combined, and operating in the manner and for the purpose herein set forth.

TREATING CAOUTCHOUC AND OTHER VULCANIZABLE GUMS.—L. Otto P. Meyer, Newton, Conn. Letters Patent No. 10,741, dated April 4, 1854. Reissue No. 797. Dated August 16, 1859.

I claim the mode of operation or mode of procedure, substantially such as herein described, which said mode of operation consists in the employment of a pliable or flexible envelope, substantially such as herein described, or the equivalent thereof, applied by pressure to the hard compound of vulcanizable gum, while in the green or plastic state, so as to insure the contact of such covering with the surface of the compound, and while thus covered or protected subjecting it to the vulcanizing heat, and when vulcanized stripping off such covering, the whole process being substantially such as specified.

ENEMA SYRINGES.—Morris Mattson, New York, N. Y. Letters Patent No. 10,742. Dated April 4, 1854.

I claim, 1st, The combination of the thumb or finger rest, d, with the barrel and piston, and for the purpose substantially as specified.

2d, I claim the upper ring valve seat, i, and the perforated tube, k, in combination with the disk or valve, h, and its seat and chamber, the same being made to operate substantially as described.

PROCESSES FOR TREATING INDIA RUBBER.—Ellsworth D. S. Goodyear, North Haven, Conn. Letters Patent No. 10,690. Dated March 28, 1854.

I claim the introduction of water or any other liquid into the interior of articles which require expansive force for their perfect formation to the interior surface of molds, said liquid to be converted into steam, substantially as described and for the purposes specified.

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